This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

**Usage guidelines**

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

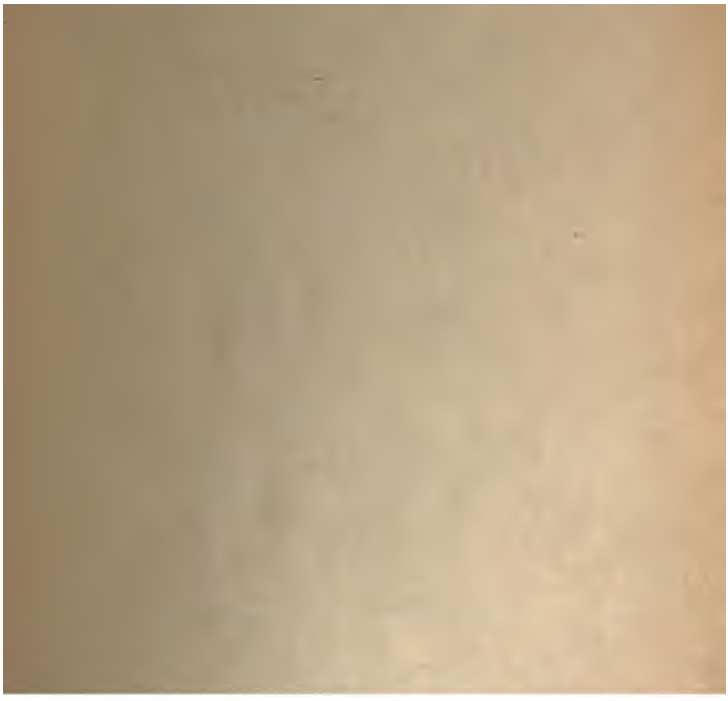
+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

**About Google Book Search**

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

NYPL RESEARCH LIBRARIES
3 3433 06640626 9

OFC
welsh



J985

THE

# MERCANTILE ARITHMETIC,

ADAPTED TO THE

## COMMERCE OF THE UNITED STATES,

IN ITS

DOMESTIC AND FOREIGN RELATIONS:

WITH AN APPENDIX,

CONTAINING

## PRACTICAL SYSTEMS

OF

## MENSURATION, GAUGING,

AND

## BOOK-KEEPING.

---

A NEW EDITION, STEREOTYPED, REVISED, AND ENLARGED

---

BY MICHAEL WALSH, A. M.

BOSTON:
CHARLES J. HENDEE.

1836.

clear and satisfactory accounts, who has a just idea of the nature of the subject, he has endeavoured to explain it with all possible precision and simplicity. This part of the work is entirely new, and he hopes, *the manner of arrangement* will attach a particular value to it. The different forms used by merchants are as various, as the demands of their business; but as all are reducible to the great principle of classing the several transactions under suitable heads, in such a way, that the state of one's property or business may be easily examined and known, this compendium may be a safe guide for a person of discernment to follow in any circumstances.

Nothing need be said of the propriety of the brief tracts of practical Mensuration and Gauging, which are annexed to the work. Such knowledge is as important and requisite, as most rules of Arithmetic, and what is inserted, is adapted to common purposes.

As the work is now under the author's control, he trusts that in future editions it will be more and more improved with whatever may occur, as conducive to its original design of rendering mercantile calculations easy and familiar. In schools it may be studied in connexion with the popular treatises of mental Arithmetic, or as a sequel to them, as will best suit the views of instructers.

# CONTENTS.


| | |
|---|---|
| **Numeration** | 9 |
| **Simple Addition** | 11 |
| **Subtraction** | 12 |
| **Multiplication** | 13 |
| **Division** | 17 |
| **Practical Questions in Federal Money** | 23 |
| **Miscellaneous Questions** | 24 |
| **Tables of Money, Weights, Measures, &c.** | 25 |
| Compound Addition | 28 |
| Compound Subtraction | 31 |
| Practical Questions in Compound Addition and Subtraction | 33 |
| Reduction | 35 |
| American Currencies | 38 |
| Compound Multiplication | 47 |
| Compound Division | 51 |
| Decimal Fractions | 54 |
| Single Rule of Three Direct | 60 |
| Inverse Proportion | 66 |
| Compound Proportion | 67 |
| Vulgar Fractions | 70 |
| Practice | 81 |
| Tare and Tret | 87 |
| Single Fellowship | 89 |
| Double Fellowship | 90 |
| Simple Interest | 91 |
| Mode of calculating the interest of notes with endorsements, and settlement within a year from the date or commencement of interest | 96 |
| Interest Account | 96 |
| Rule established by the Courts of Law of Massachusetts for making up judgments on securities for money, which are upon interest, and on which partial payments have been endorsed | 97 |
| A statement in which the interest and principal are kept more distinctly separate | 99 |
| Recapitulation of the same example | 99 |
| Statement showing how the Massachusetts and Connecticut Court Rules of calculating interest differ | 100 |
| A Table showing the number of days, from any day in any month to the same day in any other month through the year | 100 |
| Compound Interest | 101 |
| Table showing the amount of one pound or one dollar for any number of years under 33, at the rates of 5 and 6 per cent. per annum, compound interest | 102 |
| Commission and Brokerage | 102 |
| To invest or purchase so as to reserve the commission, or not to overship net proceeds | |
| Insurance | |
| Average | |

Freight - - - - - - - - - 109
An estimate of the quantity of certain goods calculated to make a ton in freight - - - - - - - - - 111
Primage - - - - - - - - - - 112
Buying and selling Stocks - - - - - - - 112
Discount - - - - - - - - 113
To raise the price of goods so as to discount without loss - 115
Bank Discount - - - - - - - - 115
Equation of Payments - - - - - - - - 116
Barter - - - - - - - - - 118
Loss and Gain - - - - - - - - 119
Alligation Medial - - - - - - - - 121
Alligation Alternate - - - - - - - - 123
Single Position - - - - - - - - 126
Double Position - - - - - - - - 127
Arithmetical Progression - - - - - - - 128
Geometrical Progression - - - - - - - 131
Permutation - - - - - - - - - 134
Extraction of the Square Root - - - - - - - 135
Extraction of the Cube Root - - - - - - - 139
Extraction of the Biquadrate Root - - - - - - 143
General Rule for extracting the Roots of all Powers - - 143
Duodecimals - - - - - - - - - 144
To find the contents of Bales, Cases, &c. in order to ascertain the freight 146
To find Ships' Tonnage by Carpenters' Measure - - - 147
To find the Government Tonnage of Ships - - - 148
Tables of Cordage - - - - - - - - 150
Geographical Questions - - - - - - - - 152
A Table showing the number of miles contained in a degree of longitude, in each parallel of latitude, from the equator to the Poles - 152
Use of the Table - - - - - - - - 153
To find the bearing of one place from another by arithmetic - - 154
A Table of angles, which every point and quarter point of the compass makes with the meridian - - - - - - 156
To reduce degrees of longitude to time - - - - - 156
To reduce time into degrees of longitude - - - - - 157
To find the part of the globe opposite to a given place - - 158
To estimate the distance of objects at sea - - - 158
Planetary Motion - - - - - - - - 159
Miscellaneous Questions - - - - - - - - 160
Mensuration - - - - - - - - - 169
Gauging - - - - - - - - - - 177
Exchange - - - - - - - - - 184
Statement of the funded debt of the United States, on the 1st of Jan. 1831, &c. 185
Exchange with Great Britain - - - - - - 186
British Stocks or Public Funds - - - - - - 186
Account of Sales of United States' Eagles - - - 190
A statement of actual sales of silver - - - - 190
Calculations of actual sales of British goods in United States - 191
A Table for reducing Sterling to Federal money at par - - 191
Exchange with Ireland - - - - - - - 192
Hamburgh - - - - - - - 192
Holland - - - - - - - - 193
Antwerp - - - - - - - - 194
Bremen - - - - - - - - 197
Denmark - - - - - - - - 197
Sweden - - - - - - - - 198

| | |
|---|---|
| tchange with Stettin | 199 |
| Russia | 200 |
| Riga | 200 |
| France | 201 |
| Marseilles | 203 |
| Spain | 204 |
| Cadiz | 204 |
| Bilboa | 205 |
| Alicant and Barcelona | 206 |
| Portugal | 206 |
| Leghorn | 207 |
| Naples | 208 |
| Trieste | 208 |
| Genoa | 209 |
| Palermo and Sicily | 209 |
| Venice | 210 |
| Malta | 210 |
| Smyrna | 210 |
| Commerce of Smyrna, from the Oriental Herald | 213 |
| Odessa | 218 |
| Calcutta | 220 |
| Table for reducing English weight to Factory Maunds by inspection | 222 |
| xchange with Bombay | 224 |
| Madras | 225 |
| Java | 226 |
| Canton | 226 |
| Manilla | 229 |
| Columbo, Isle of Ceylon | 229 |
| Japan | 230 |
| Jamaica and Bermudas | 231 |
| Barbadoes | 231 |
| Martinico | 232 |
| Guadaloupe | 232 |
| Cuba, Porto Rico, and Trinidad | 232 |
| St. Thomas | 233 |
| St. Martins | 234 |
| St. Eustatia | 234 |
| Brazil—Rio Janeiro | 234 |
| rbitration of Exchange | 236 |
| omparative values of English, French, Spanish, and United States' Coins | 237 |
| 'eights of Silver Coins | 239 |
| urrent Money | 241 |
| merican Duties | 245 |
| able of the value of the gold coins of Great Britain, France, and Spain | 248 |
| ook-Keeping | 249 |
| ercantile Precedents | 309 |
| irections to Ship-Masters | 325 |
| iscellaneous Questions—Part 2 | 328 |

## EXPLANATION

OF THE

## CHARACTERS USED IN THIS WORK.

$=$ SIGNIFIES equality, or equal to: as 20 shillings $=$ one pound: that is, 20 shillings are equal to 1 pound.

$+$ Signifies more, or Addition: as, $6+6=12$: that is, 6 added to 6 is equal to 12.

$-$ Signifies less, or Subtraction: as, $6-2=4$: that is, 6 less 2 is equal to 4.

$\times$ Signifies Multiplication: as, $6\times2=12$: that is, 6 multiplied by 2 is equal to 12.

$\div$ Signifies Division: as, $6\div2=3$: that is, 6 divided by 2 is equal to 3.

Division is sometimes expressed by placing the numbers like a fraction, the upper figures being the dividend, and the lower the divisor: thus, $\frac{54}{6}=9$: that is, 54 divided by 6 is equal to 9.

$::::$ Proportion: as $3:6::9:18$: that is, as 3 is to 6, so is 9 to 18.

$\surd$ Prefixed to any number, signifies that the square root of that number is required.

A line or vinculum, drawn over several numbers, signifies, that the numbers under it are to be considered *jointly*: as $8-\overline{3+4}=1$: but without the line, $8-3+4=9$.

# MERCANTILE ARITHMETIC.

ARITHMETIC is the art of computing by numbers, and has five principal rules for this purpose, viz. *Numeration*, *Addition*, *Subtraction*, *Multiplication*, and *Division*.

## NUMERATION

Teacheth to express any proposed number by these ten characters, 0. 1. 2. 3. 4. 5. 6. 7. 8. 9.—0 is called a cipher, and the rest, figures or digits. The relative value of which depends upon the place they stand in, when joined together, beginning at the right hand, as in the following

### TABLE.

| hundreds of millions. | tens of millions. | millions. | hundreds of thousands. | tens of thousands. | thousands. | hundreds. | tens. | units. |
|---|---|---|---|---|---|---|---|---|
| 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

Though the table consists of only nine places, yet it may be extended to more places at pleasure; as, after hundreds

of millions, read thousands of millions, ten thousands of millions, hundred thousands of millions, billions, trillions, quadrillions, quintillions, sextillions, septillions, octillions, nonillions, decillions, undecillions, &c. as in the following example:

| Periods. | Quadrill. | | Trillions. | | Billions. | | Millions. | | Units. | |
|---|---|---|---|---|---|---|---|---|---|---|
| Half-per. | th. | un. | th. | un. | th. | un. | th. | un. | c.x.t. | c.x.u. |
| Figures. | 123, | 456. | 789, | 098. | 765, | 432. | 101, | 234. | 567, | 890. |

*TO WRITE NUMBERS.*

RULE. Write down the figures as their values are expressed, and supply any deficiency in the order with ciphers.

EXAMPLES.

*Write down in proper figures the following numbers.*

Twenty-nine.
Two hundred and forty-seven.
Seven thousand nine hundred and one.
Eighty-four thousand three hundred and twenty-nine.
Nine hundred and two thousand six hundred and fifteen.
Eighty-nine millions and ninety.
Four millions four hundred thousand and forty.
Nine hundred and nine millions nine hundred and ninety.
Seventy millions seventy thousand and seventy.

*To express in words any number proposed in figures.*

RULE. To the simple value of each figure, join the name of its place, beginning at the left hand, and reading towards the right.

EXAMPLES.

*Write down in words the following numbers.*

46, 199, 2267, 86693, 289732, 11911911.
1169990, 9919, 7114320, 3155000510, 1375684001957.

## SIMPLE ADDITION

Teacheth to collect numbers of the same denomination into one sum.

RULE. Place the numbers under each other so that units may stand under units, tens under tens, and so on, and draw a line under them.

Add the first row or right hand column, and find how many tens are contained in them.—Set down the remainder, and carry as many units or ones to the next column, as there are tens. In like manner carry the tens of each column, till the whole be finished.

PROOF. The mercantile method of proving addition is to reckon downwards as well as upwards, or to divide the sum to be added into several divisions or parcels, add these separately, and then add their sums together.—If the amount of these be the same as the amount obtained by adding at once, it may be presumed the true amount is obtained.

EXAMPLES.

| | | | | |
|---|---|---|---|---|
| 2 | 22 | 2345 | 6784 | 67491 |
| 6 | 33 | 2345 | 2936 | 14373 |
| 4 | 44 | 4352 | 8291 | 26852 |
| 5 | 55 | 5432 | 4174 | 17473 |
| 6 | 66 | 6625 | 3259 | 91568 |
| 23 | 220 | 21099 | | |

*Add the following sums, viz.*

76389. 576. 8799. 7. 532. 900. 45913 and 19, together.

76389
576
8799
532
7
900
45913
19

6741. 86. 95310. 15. 10019. 571. 26 and 7993, together.

6741
86
95310
15
10019
571
26
7993

*Add the following numbers, viz.*

1.2.3.4.5.6.7.8 and 9 together. Ans. 45
9.8.7.6.5.4.3.2 . . 1 . . . . . 45
5.6.7.9.8.6.3.5.4 . . 2 . . . . . 55
6.7.9.3.4.9.6.7.4 . . 8 . . . . . 63
8.4.7.6.9.4.3.9.7 . . 6 . . . . . 63
7.3.8.4.7.9.5.6.8.5 . . 4 . . . . . 66
6.9.5.4.8.6.3.9.9.8.6 . . 9 . . . . . 82
9.6.8.9.9.3.6.8.4.5.9 . . 6 . . . . . 82
7.8.9.4.5.6.8.9.9.7.7.3 . . 4 . . . . . 86
4.3.7.7.9.9.8.6.5.4.9.8 . . 7 . . . . . 86
8.7.4.9.5.2.1.7.9.8.3.6.2 . . 9 . . . . . 80
9.2.6.3.8.9.7.1.2.5.9.4.7 . . 8 . . . . . 80
5 6.5.8.9.3.7.4.9.8.7.5.6.3.7.9.9.8.7.4 . . 6 . . . . . 135
7.3.9.5.8.5.6.9.4.8.6.5.7.9.3.7.7.8.9.6 . . 4 . . . . . 135

## SIMPLE SUBTRACTION

Teacheth to take a less number from a greater of the same denomination, and thereby show the difference.

The greater is called the *minuend*, and the less the *subtrahend*.

Rule. Place the subtrahend or less number, under the minuend or greater, and subtract units from units, tens from tens, and so on. If any figure of the subtrahend be greater than the corresponding one of the minuend, borrow ten; that is, add ten to the upper figure, and then subtract the lower from the sum, set down the remainder, and carry one to the next figure of the subtrahend.

Proof. Add the remainder to the subtrahend, and if the sum is equal to the minuend, the work is right.

Examples.

| | | | |
|---|---|---|---|
| Minuend | 5678943 | 56474 | 67143 |
| Subtrahend | 1354732 | 13845 | 41872 |
| Remainder | 4324211 | 42629 | 25271 |
| Proof | 5678943 | 56474 | 67143 |

| | | | |
|---|---|---|---|
| From | 467328 | 6105413 | 864175 |
| take | 179814 | 2714825 | 373196 |
| Difference | 287514 | | |
| Proof | 467328 | | |
| From | 510700930 | 51901146 | 601191005 |
| take | 170910742 | 29700913 | 110910930 |
| Difference | 339790188 | | |
| Proof | 510700930 | | |

## SIMPLE MULTIPLICATION

Is a compendious way of adding numbers of the same name, as in the following tables of adding and multiplying. The number to be multiplied is called the *multiplicand*. The number which multiplies is called the *multiplier*. The number arising from the operation is called the *product*.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 | 240 |

*MULTIPLICATION TABLE.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
| 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 84 |
| 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 99 | 108 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99 | 110 | 121 | 132 |
| 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |

RULE. Place the multiplier under the multiplicand and multiply the latter successively by the significant figures of the former; if the multiplier consist of more figures than one, place the right hand figure of each product under the figure from which it arises; then add the several products, and their sum is the product of both factors, and the answer required.

EXAMPLES.

| 76432 × 2 = 152864 | 76432 × 3 = 229296 | 76432 × 4 = 305728 | 76432 × 5 = 382160 |
|---|---|---|---|

| 76432 × 2345 | 76432 × 5432 |
|---|---|
| 382160 | 152864 |
| 305728. | 229296. |
| 229296.. | 305728.. |
| 152864... | 382160... |
| 179233040 | 415178624 |

| 67893 × 6 = 407358 | 67893 × 7 = 475251 | 67893 × 8 = 543144 | 67893 × 9 = 611037 |
|---|---|---|---|

| | |
|---|---|
| 67893 | 39876 |
| 98060 | 60709 |
| 4073580 | 358884 |
| 5431440*. | 2791320. |
| 611037.... | 2392560... |
| 6657587580 | 2420832084 |

| | | | |
|---|---|---|---|
| 632951 | 560932 | 678057 | 6096874 |
| 10 | 12 | 20 | 7000 |
| 6329510 | 6731184 | 13561140 | 42673118000 |

| | | | | | |
|---|---|---|---|---|---|
| 1. | Multiply | 8763513 | by 1 | product | 8763513 |
| 2. | . . . . | 3765434 | 2 | . . . . . | 7530868 |
| 3. | . . . . | 2719876 | 3 | . . . . . | 8159628 |
| 4. | . . . . | 5741967 | 4 | . . . . . | 22967868 |
| | | | | Sum of products | 47421877 |

| | | | | | |
|---|---|---|---|---|---|
| 5. | Multiply | 7189205 | by 5 | product | 35946025 |
| 6. | . . . . | 8197591 | 6 | . . . . . | 49185546 |
| 7. | . . . . | 5787914 | 7 | . . . . . | 40515398 |
| 8. | . . . . | 2678719 | 8 | . . . . . | 21429752 |
| | | | | Sum of products | 147076721 |

| | | | | | |
|---|---|---|---|---|---|
| 9. | Multiply | 591873 | by 9 | product | 5326857 |
| 10. | . . . . | 598935 | 10 | . . . . . | 5989350 |
| 11. | . . . . | 219674 | 11 | . . . . . | 2416414 |
| | | | | Sum of products | 13732621 |

| | | | | | |
|---|---|---|---|---|---|
| 12. | Multiply | 906897 | by 12 | product | 10882764 |
| 13. | . . | 795384 | 20 | . . . . . | 15907680 |
| 14. | . . . . | 389157 | 700 | . . . . . | 272409900 |
| | | | | Sum of products | 299200344 |

* Writing a cipher under the cipher in the multiplier preserves its local value in the product, and prevents an error in placing the next figure.

| Multiply | 968753 | Or thus | 968753 | |
|---|---|---|---|---|
| by | 7953 | | 7000 | |
| | 2906259 | | 6781271000 | product by 7000 |
| | 4843765. | | .871877700 | . . 900 |
| | 8718777.. | | ..48437650 | . . 50 |
| | 6781271... | | ...2906259 | . . 3 |
| product | 7704492609 | | 7704492609 | |

| Multiply | 675084 | Multiply | 875039 |
|---|---|---|---|
| by 7 | product 4725588 | by 12 | product 10500468 |
| 8 | . . | 300 | . . |
| 9 | . . | 540 | . . |
| 10 | . . | 2609 | . . |
| 11 | . . | 75070 | . . |
| 12 | . . | 78 | . . |
| 20 | . . | 1390 | . . |
| Sum of products | 51981468 | Sum of products | 70002244961 |

When the multiplier is 10, 100, 1000, &c. the product is found by annexing the ciphers to the multiplicand for the answer. In this way, dollars may be reduced to cents and mills; and if there be cents, or cents and mills, annexed to the dollars, remove the separating point or points, and read the whole for the answer, in the same name with the lowest denomination mentioned.

EXAMPLES.

In 513 dollars of 100 cents each, how many cents?
Ans. 51300 cents.

How many mills in 871 dollars of 1000 mills each?
Ans. 871000 mills.

In $147,53 cts. how many cents? Ans. 14753 cents.

In 814 dols. 37 cts. 8 mills, how many mills?
Ans. 814378 mills.

*To multiply by fractions, or parts of an unit.*

RULE. Multiply the given number by the numerator, or upper figure of the fraction, and divide the product by the denominator or lower figure for the answer.

EXAMPLES.

How much is $\frac{3}{8}$ of 584.

584
3 numerator.

denom. 8)1752

Ans. 219

How much is $\frac{7}{16}$ of 480.

480
7

16)3360

Ans. 210

## *SIMPLE DIVISION*

Teacheth to find how often one number is contained in another of the same name.

The number to be divided, is called the *dividend.*

The number by which to divide, is called the *divisor.*

The number of times the divisor is contained in the dividend, is called the *quotient.*

The *remainder,* if there be any, will be less than the divisor.

RULE. On the right and left of the dividend draw a curved line, and write the divisor on the left hand, and the quotient as it arises on the right.

Find how many times the divisor is contained in as many figures of the dividend, as are necessary, and write the number in the quotient.

Multiply the divisor by the quotient figure, and set the product under that part of the dividend used.

Subtract the product, last found, from that part of the dividend under which it is placed, and to the right hand of the remainder bring down the next figure of the dividend; divide this number as before, and so on, till the whole is finished.

If it be necessary to bring down more figures than one to the remainder, in order to make it as large as the divisor, a cipher must be written in the quotient for every figure so brought down, till the number be sufficient to contain the divisor.

PROOF. Multiply the quotient by the divisor, and to the product add the remainder, and the sum will be equal to the dividend, if the work be right.

When there are ciphers annexed to the divisor, cut off the ciphers from it, and the same number of digits from the

dividend, then divide the remaining figures by each other, as usual, the quotient is the answer, and what remains, placed before the figures cut off, is the true remainder.

When the divisor does not exceed 12, or is a composite number, or when ciphers may be cut off from it, the division may be shortened by multiplying and dividing mentally, and writing the quotient under the dividend.

EXAMPLES.

| 1)6759384 | 2)4684628 | 3)9363639 |
|---|---|---|
| 6759384 | 2342314 | 3121213 |

| 2)153 | 3)197 | 4)267 | 5)287 | 7)348 | 9)654 |
|---|---|---|---|---|---|
| 76–1 rem. | 65–2 | 66–3 | 57–2 | 49–5 | 72–6 |

| 12)2687 | 2,0)567,4 | 4,00)675,62 | 8,00)255,74 |
|---|---|---|---|
| 223–11 rem. | 283–14 | 168–362 | 31–774 |

| 43)366892(8532 *Quotient.* | 31,00)7948,35( 256 *Quotient.* |
|---|---|
| 344 | 62 3100 |
| 228 | 174 25600 |
| 215 | 155 768... |
| 139 | 198 1235 |
| 129 | 186 794835 proof. |
| 102 | 12 35 rem. |
| 86 | |
| 16 rem. | |

When the divisor is large, a table may be formed of the products of the nine digits, (either by multiplying or succes-

sively adding) by which, the quotient figures to the several dividends, may be readily found: thus,

| *Divisor.* | *Dividend.* | *Quotient.* |
|---|---|---|
| 3956)34585539543( | | 8742552 |
| 31648 | | 3956 |
| 29375 | | 52455312 |
| 27692 | | 43712760. |
| | | 78682968.. |
| *The Table.* 16833 | | 26227656... |
| 3956 by 2= 7912 15824 | | 3831 |
| 3=11868 | | |
| 4=15824 10099 | Proof | 34585539543 |
| 5=19780 7912 | | |
| 6=23736 | | |
| 7=27692 21875 | | |
| 8=31648 19780 | | |
| 9=35604 | | |
| 20954 | | |
| 19780 | | |
| 11743 | | |
| 7912 | | |
| 3831 remainder | | |

| | | | | | *Quotients.* | *Rem'rs.* |
|---|---|---|---|---|---|---|
| 1. | Divide | 4507109 | by | 1 | 4507109 | 0 |
| 2. | | 7687267 | | 2 | 3843633 | 1 |
| 3. | | 8719875 | | 3 | 2906625 | 0 |
| 4. | | 2687146 | | 4 | 671786 | 2 |
| 5. | | 1760019 | | 5 | 352003 | 4 |
| 6. | | 2109173 | | 6 | 351528 | 5 |

| | | | | | *Quotients.* | *Rem'rs.* |
|---|---|---|---|---|---|---|
| 7. | Divide | 576973 | by | 7 | 82424 | 5 |
| 8. | | 867918 | | 9 | 96435 | 3 |
| 9. | | 170038 | | 10 | 17003 | 8 |
| 10. | | 376859 | | 11 | 34259 | 10 |
| 11. | | 291005 | | 12 | 24250 | 5 |
| 12. | | 1876719 | | 20 | 93835 | 19 |
| 13. | | 2326174 | | 600 | 3876 | 574 |

| | | | | | *Quotients.* | *Rem'rs.* |
|---|---|---|---|---|---|---|
| 14. | Divide | 8917653 | by | 16 | 557355 | 5 |
| 15. | | 1711190 | | 19 | 90062 | 12 |
| 16. | | 2687132 | | 25 | 107485 | 7 |
| 17. | | 1191009 | | 39 | 30538 | 27 |
| 18. | | 2711193 | | 79 | 34318 | 71 |
| 19. | | 1896371 | | 119 | 15935 | 106 |
| 20. | Divide | 1191467 | by | 57 | 20902 | 53 |
| 21. | | 3182952 | | 87 | 36585 | 57 |
| 22. | | 1198714 | | 396 | 3027 | 22 |
| 23. | | 2019126 | | 1918 | 1052 | 1390 |
| 24. | | 1091462 | | 5939 | 183 | 4625 |
| 25. | Divide | 1765391 | by | 180 | 9807 | 131 |
| 26. | | 7149533 | | 5700 | 1254 | 1733 |
| 27. | | 6100587 | | 9300 | 655 | 9087 |
| 28. | | 1910051 | | 6400 | 298 | 2851 |
| 29. | | 9991872 | | 89000 | 112 | 23872 |

When the divisor is a composite number, that is, if any two figures, being multiplied together, will make that number, then divide the dividend by one of those figures, and the first quotient by the other figure, and it will then give the quotient required.—But as it sometimes happens that there is a remainder to each of the quotients, and neither of them the true one, it may be found by this

RULE. Multiply the first divisor by the last remainder, and to the product add the first remainder, which will give the true one.

EXAMPLES.

Divide 296876234 by 64.

8)296876234

8)37109529—2

Quotient 4638691 and $1\times8+2=10$ remaining.

Divide 8757635 by 28.

Quotient 312772 and 19 rem.

Divide 18957492 by 42.

451368 and 36 rem.

n the price of a ton or 2240 lbs. of Old Sable iron is
ıow much is it per lb. ?

40×8×7 { 40)11200 / 8)280 / 7)35 }

Or, 2240)11200(5 cents.
11200

Ans. 5 cents.

ivide by mixed numbers, or a whole number and a
ı.

E. Reduce the divisor and dividend into the same
and divide as usual; if there is a remainder, reduce
value in integers.

EXAMPLES.

16½ yards, how many perches of 5½ yards each ?

5½ × 2 = 11 )346½ × 2 = 693

Ans. 63 perches.

many perches or poles, of 16½ feet each, in 1790¼

16½ × 4 = 66 )1790¼ × 4 = 7161(108
66
561
528
4)33 quarters.
8¼ Ans. 108 per. and 8¼ feet.

ın the divisor is 10, 100, 1000, &c. the figures of the
ıd, that remain after pointing, give the quotient or
without dividing, and in this way, mills and cents

are reduced to dollars, by pointing off in the dividend for the ciphers in the divisor, for dollars.

EXAMPLES.

In 16875 mills how many dollars of 1000 mills each ?

1,000)16,875

Ans. $16,87 cts. 5 mills.

In 18768 cents how many dollars of 100 cents each ?

1,00)187,68

Ans. $187,68 cents.

---

*PRACTICAL QUESTIONS IN FEDERAL MONEY.*

1. How much will 1875 lbs. amount to at 9 mills per lb.?

1875
9

16875 mills.

Ans. $16,87 cts. 5 mills.

2. At 12 cents per lb. how much will 1564 lbs. of sugar come to ?

1564
12

18768 cents.

Ans. $187,68 cents.

3. What will 57 barrels of flour come to at $5 per barrel ?

57
5

Ans. $285

4. How much will 12 yards of cloth come to at $5,37 cts. per yard ?

5,37
12

Ans. $64,44 cents.

5. 976 lbs. of pepper at 17¾ cents per lb.

976
17¾

6832
976
488 at ½ cent.
244 at ¼ cent.

17324 cents.

Or thus,

9760 at 10 cents.
6832 7 "
488 ½ "
244 ¼ "

Ans. $173,24 cents.

6. 874 lbs. at $4\frac{1}{2}$ cents per lb.

874
4

3496 at 4 cents.
437 at $\frac{1}{2}$ cent.

Ans. $39,33 cents.

7. $46\frac{1}{4}$ yards at 28 cents.

46
28

368
92
$\frac{1}{4}$ of 28 7

Ans. $12,95 cents.

8. $57\frac{1}{2}$ yards at 36 cents.

57
36

342
171
$\frac{1}{2}$ of 36 18

Ans. $20,70 cents.

9. $96\frac{3}{4}$ yards at $2,48 per yard.

248
96

1488
2232
$\frac{1}{2}$ yard 124
$\frac{1}{4}$ yard 62

Ans. $239,94 cents.

10. What will 2352 lbs. of white sugar come to at $13\frac{3}{8}$ cents per lb.

2352
13

30576
At $\frac{3}{8}$ or $\frac{1}{4}$ ct. 588
$\frac{1}{8}$ 294

Ans. $314,58 cents

Or thus,

23520 at 10 cents.
7056 " 3
588 " $\frac{3}{8}$
294 " $\frac{1}{8}$

$314,58

11. What is the freight of 205 hhds. of tobacco, weighing 279612 lbs. at $1\frac{1}{4}$ ct. per lb.

279612 at 1 ct. per lb.
69903 " $\frac{1}{4}$ "

Ans. $3495,15 cents.

12. What is the primage on this freight at 5 per cent ?

3495,15
5

cts. 17475,75

Or thus,

$5 = \frac{1}{20}$)3495,15

174,75

Ans. $174,75$\frac{3}{4}$

13. What will 39584 lbs. of plaster of Paris come to at $4,50 per ton of 2240 lbs.?

39584
4½
158336
19792
40)178128
8)4453,2
7)556,65
Ans. $79,52

2240=40×8×7

14. What is the amount of a cargo of lumber, measuring 23468 feet at $12,50 cents per thousand, equal to 12½ mills per foot?

23468
12½
at 12 mills 281616
½ " 11734
2933,50 mills.
Ans. $203,35 cents.

Lumber is reckoned at as many mills per foot, as there are dollars per thousand.

## *MISCELLANEOUS QUESTIONS.*

1. Add 562163, 21964, 56321, 18536, 4340, 279, and 83 together. Ans. 663686.

2. What number is it, which being added to 9709 will make 110901? Ans. 101192.

3. General WASHINGTON was born in the year 1732, and he died in 1799: What was his age? Ans. 67 years.

4. Add up twice 397, three times 794, four times 3176, five times 15880, six times 95280, and once 333040.
Ans One Million.

5. 128 men have one half of a prize, worth 34560 dollars, to be equally divided between them: What is each man's part? Ans. 135 dollars.

Prove this answer to be right.

6. Three merchants, A, B, and C, have a stock of 14876 dollars, of which A put in 4963 dollars, B 5188 dollars, and C the remainder: How much did C put in?

Ans. 4725 dollars.

---

*TABLE OF MONEY, WEIGHTS, MEASURES, &c.*

FEDERAL MONEY.

| | | | |
|---|---|---|---|
| 10 | Mills | make | 1 Cent. |
| 10 | Cents | | 1 Dime. |
| 10 | Dimes, or 100 Cents | | 1 Dollar. |
| 10 | Dollars | | 1 Eagle. |

ENGLISH MONEY.

| | | | |
|---|---|---|---|
| 4 | Farthings | make | 1 Penny. |
| 12 | Pence | | 1 Shilling. |
| 20 | Shillings | | 1 Pound. |

TROY WEIGHT.

| | | | |
|---|---|---|---|
| 24 | Grains | make | 1 Pennyweight. |
| 20 | Pennyweights | | 1 Ounce. |
| 12 | Ounces | | 1 Pound. |

NOTE. By this weight are weighed jewels, gold, silver, and liquors.

The fineness of gold is generally expressed in carats. Thus any price or quantity of it is divided into 24 equal parts or carats, and the number of these remaining after it is assayed, shows its fineness.—As the imaginary unit of reference may be any weight, the carat of gold or silver therefore has no specific weight.

The diamond carat is $3\frac{1}{6}$ grains Troy.
5 pearl carats 4 " "

AVOIRDUPOIS WEIGHT.

| | | | |
|---|---|---|---|
| 16 | Drams | make | 1 Ounce. |
| 16 | Ounces | | 1 Pound. |
| 28 | Pounds | | 1 Quarter. |
| 4 | Quarters | | 1 Hundred weight. |
| 20 | Hundred weight | | 1 Ton. |

NOTE. By this weight are weighed such commodities as are coarse and subject to waste, and all metals except gold and silver. One pound Avoirdupois is equal to 14 oz. 11 pwts. and $15\frac{1}{2}$ grs. Troy.

### Apothecaries' Weight.

| | | | |
|---|---|---|---|
| 20 | Grains | make | 1 Scruple. |
| 3 | Scruples | | 1 Dram. |
| 8 | Drams | | 1 Ounce. |
| 12 | Ounces | | 1 Pound. |

Note. Apothecaries use this weight in compounding their medicines; but they buy and sell their drugs by Avoirdupois weight.

### Cloth Measure.

| | | | |
|---|---|---|---|
| 4 | Nails | make | 1 Quarter. |
| 4 | Quarters | | 1 Yard. |
| 3 | Quarters | | 1 Ell Flemish. |
| 5 | Quarters | | 1 Ell English. |
| 6 | Quarters | | 1 Ell French. |

### Long Measure.

| | | | |
|---|---|---|---|
| 3 | Barley Corns | make | 1 Inch. |
| 12 | Inches | | 1 Foot. |
| 3 | Feet | | 1 Yard. |
| 5½ | Yards, or 16½ feet | | 1 Pole, Rod, or Perch. |
| 40 | Poles, or 220 yards | | 1 Furlong. |
| 8 | Furlongs | | 1 Mile. |
| 3 | Miles | | 1 League. |
| 60 | Geographical miles | | 1 Degree. |
| 69½ | Statute miles | | |

Note. In this measure length only is considered.

### Land or Square Measure.

| | | | |
|---|---|---|---|
| 144 | Square Inches | make | 1 Square Foot. |
| 9 | Feet | | 1 Yard. |
| 30¼ | Yards, or | | 1 Pole, Rod, or Perch. |
| 272¼ | Feet | | |
| 40 | Poles or Perches | | 1 Rood. |
| 4 | Roods | | 1 Acre. |
| 640 | Acres | | 1 Mile. |
| 3097600 | Square Yards | | |
| 605 | Arpents in Louisiana | | 112 Acres. |

Note. This measure respects length and breadth.

### Wine Measure.

| | | | |
|---|---|---|---|
| 2 | Pints | make | 1 Quart. |
| 4 | Quarts | | 1 Gallon. |
| 42 | Gallons | | 1 Tierce. |
| 63 | Gallons | | 1 Hogshead. |
| 84 | Gallons | | 1 Puncheon. |
| 2 | Hogsheads | | 1 Pipe or Butt. |
| 2 | Pipes or 4 Hogsheads | | 1 Tun. |

Note. The wine gallon contains 231 cubic inches.

### Ale and Beer Measure.

| | | | |
|---|---|---|---|
| 2 | Pints | make | 1 Quart. |
| 4 | Quarts | make | 1 Gallon. |
| 8 | Gallons | make | 1 Firkin of Ale. |
| 9 | Gallons | make | 1 Firkin of Beer. |
| 2 | Firkins | make | 1 Kilderkin. |
| 2 | Kilderkins | make | 1 Barrel. |
| 54 | Gallons | make | 1 Hhd. of Beer. |
| 3 | Barrels | make | 1 Butt. |

Note. The ale gallon contains 282 cubic inches.

### Cubic or Solid Measure.

| | | | |
|---|---|---|---|
| 1728 | Inches | make | 1 Foot. |
| 27 | Feet | make | 1 Yard. |
| 40 Feet of round Timber or 50 Feet of hewn Timber | | make | 1 Ton or Load.* |
| 128 | Solid Feet | make | 1 Cord of Wood. |

Note. 8 feet in length, 4 in breadth, and 4 in height, making 128 solid feet, contain a cord of wood, and 16 such feet make 1 foot cord-wood measure. —This measure respects length, breadth, and thickness.

[*This may have reference either to the solidity, or to the stowage on ship-board.]

### Dry Measure.

| | | | |
|---|---|---|---|
| 2 | Pints | make | 1 Quart. |
| 2 | Quarts | make | 1 Pottle. |
| 2 | Pottles | make | 1 Gallon. |
| 2 | Gallons | make | 1 Peck. |
| 4 | Pecks | make | 1 Bushel. |
| 2 | Bushels | make | 1 Strike. |
| 4 | Bushels | make | 1 Coom. |
| 8 | Bushels | make | 1 Quarter. |
| 36 | Bushels | make | 1 Chaldron. |
| 5 | Quarters | make | 1 Wey. |
| 2 | Weys | make | 1 Last. |

Note. The gallon dry measure contains 268$\frac{1}{4}$ cubic inches.

### Time.

| | | | |
|---|---|---|---|
| 60 | Seconds | make | 1 Minute. |
| 60 | Minutes | make | 1 Hour. |
| 24 | Hours | make | 1 Day. |
| 365 | Days | make | 1 Year. |

Note. 365 days, 5 hours, 48 minutes, 57 seconds make a solar year, according to the most exact observation.

The number of days in each month is thus found:

*Thirty* days hath September, April, June, and November;
February hath *twenty-eight* alone, and all the rest have *thirty-one.*

When the year can be divided by 4 without a remainder, it is Bissextile or Leap-Year, in which February hath 29 days.

MOTION.

| | | |
|---|---|---|
| 60 Seconds (60″) | make | 1 Minute—1′ |
| 60 Minutes | | 1 Degree—1° |
| 30 Degrees | | 1 Sign |
| 12 Signs, or 360 degrees | | 1 Great circle. |

## COMPOUND ADDITION.

Teacheth to collect numbers of different denominations into one total.

RULE. Arrange the numbers so that those of the same denomination may stand directly under each other, and draw a line under them.

Add the numbers in the lowest denomination together, and find how many units of the next higher denomination are contained in their sum.

Write down the remainder, and carry the units to the next higher denomination, and proceed thus to the end.

FEDERAL MONEY.

| $ | c. | m. | $ | c. | m. |
|---|---|---|---|---|---|
| 174 | 74 | 3 | 396 | 14 | 4 |
| 198 | 19 | 3 | 147 | 19 | 5 |
| 157 | 14 | 4 | 149 | 57 | 9 |
| 196 | 76 | 9 | 157 | 83 | 8 |

ENGLISH MONEY.

| £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|
| 149 | 14 | 6¾ | 814 | 16 | 6¼ |
| 387 | 19 | 8½ | 198 | 18 | 8¾ |
| 259 | 16 | 7¼ | 376 | 14 | 9½ |
| 874 | 17 | 4¾ | 226 | 16 | 7¾ |
| 678 | 15 | 6½ | 174 | 17 | 10½ |

### Troy Weight.

| lb. | oz. | dwt. | gr. | lb. | oz. | dwt. | gr. |
|---|---|---|---|---|---|---|---|
| 48 | 7 | 14 | 17 | 83 | 11 | 15 | 22 |
| 95 | 4 | 17 | 22 | 16 | 6 | 16 | 19 |
| 27 | 4 | 14 | 15 | 21 | 8 | 19 | 23 |
| 65 | 8 | 19 | 16 | 33 | 9 | 15 | 14 |
| 19 | 7 | 13 | 15 | 46 | 3 | 13 | 17 |
| 23 | 9 | 15 | 13 | 54 | 7 | 17 | 16 |

### Avoirdupois Weight.

| ton. | cwt. | qr. | lb. | oz. | dr. | cwt. | qr. | lb. |
|---|---|---|---|---|---|---|---|---|
| 18 | 17 | 1 | 14 | 13 | 13 | 593 | 1 | 19 |
| 36 | 15 | 3 | 16 | 14 | 15 | 187 | 3 | 19 |
| 29 | 15 | 2 | 19 | 12 | 13 | 159 | 2 | 25 |
| 14 | 16 | 3 | 27 | 14 | 12 | 283 | 3 | 13 |
| 16 | 19 | 2 | 25 | 13 | 10 | 146 | 2 | 18 |
| 57 | 17 | 1 | 14 | 15 | 9 | 259 | 1 | 22 |

### Apothecaries' Weight.

| lb. | oz. | dr. | sc. | gr. | lb. | oz. | dr. | sc. | gr. |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 7 | 5 | 1 | 17 | 2 | 5 | 3 | 2 | 11 |
| 1 | 3 | 2 | 2 | 13 | 1 | 2 | 2 | 1 | 14 |
| 2 | 5 | 3 | 2 | 14 | 3 | 3 | 5 | 2 | 13 |
| 3 | 4 | 2 | 1 | 15 | 5 | 5 | 4 | 1 | 12 |
| 4 | 9 | 2 | 2 | 17 | 2 | 9 | 3 | 2 | 15 |
| 2 | 3 | 1 | 2 | 18 | 1 | 6 | 4 | 2 | 17 |

### Cloth Measure.

| Yd. | qr. | nl. | E.Fl. | qr. | nl. | E.Fr. | qr. | nl. | E.E. | qr. | nl. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 571 | 1 | 3 | 873 | 2 | 3 | 181 | 2 | 2 | 56 | 1 | 2 |
| 184 | 2 | 2 | 196 | 2 | 2 | 196 | 3 | 3 | 19 | 2 | 3 |
| 198 | 2 | 3 | 158 | 1 | 1 | 156 | 4 | 2 | 14 | 3 | 2 |
| 283 | 3 | 2 | 147 | 2 | 3 | 168 | 3 | 3 | 26 | 4 | 3 |
| 146 | 2 | 3 | 326 | 2 | 2 | 193 | 5 | 2 | 83 | 2 | 2 |
| 375 | 3 | 2 | 194 | 2 | 1 | 214 | 2 | 3 | 57 | 3 | 3 |

## Wine Measure.

| *Tun.* | *hhd.* | *gal.* | *qt.* | *pt.* |
|---|---|---|---|---|
| 187 | 1 | 17 | 3 | 1 |
| 58 | 3 | 15 | 2 | 1 |
| 9 | 1 | 29 | 3 | 1 |
| 36 | 2 | 18 | 2 | 1 |
| 217 | 3 | 57 | 1 | 1 |
| 56 | 1 | 46 | 2 | 1 |

| *Tun.* | *hhd.* | *gal.* | *qt.* | *pt.* |
|---|---|---|---|---|
| 177 | 3 | 16 | 2 | 1 |
| 56 | 2 | 57 | 3 | 1 |
| 8 | 3 | 14 | 2 | 1 |
| 17 | 2 | 19 | 1 | 1 |
| 68 | 1 | 38 | 2 | 1 |
| 25 | 2 | 52 | 3 | 1 |

## Ale and Beer Measure.

| *Hhd.* | *gal.* | *qt.* | *pt.* |
|---|---|---|---|
| 49 | 38 | 2 | 1 |
| 38 | 45 | 3 | 1 |
| 57 | 48 | 2 | 1 |
| 49 | 37 | 1 | 1 |
| 57 | 26 | 2 | 1 |
| 28 | 18 | 3 | 1 |

| *Hhd.* | *gal.* | *qt.* | *pt.* |
|---|---|---|---|
| 78 | 17 | 3 | 1 |
| 19 | 16 | 2 | 1 |
| 15 | 51 | 3 | 1 |
| 76 | 43 | 2 | 1 |
| 23 | 26 | 3 | 1 |
| 52 | 38 | 2 | 1 |

## Dry Measure.

| *Qr.* | *bush.* | *pck.* | *qt.* |
|---|---|---|---|
| 57 | 4 | 2 | 1 |
| 19 | 5 | 3 | 1 |
| 38 | 6 | 2 | 3 |
| 27 | 7 | 3 | 7 |
| 9 | 2 | 2 | 3 |
| 72 | 5 | 3 | 2 |

| *Chal.* | *bush.* | *pck.* | *qt.* |
|---|---|---|---|
| 576 | 31 | 1 | 3 |
| 19 | 27 | 2 | 2 |
| 56 | 15 | 3 | 5 |
| 25 | 8 | 2 | 4 |
| 14 | 15 | 2 | 3 |
| 32 | 26 | 3 | 2 |

## Long Measure.

| *Deg.* | *mil.* | *fur.* | *po.* | *ft.* | *in.* | *bar.* |
|---|---|---|---|---|---|---|
| 217 | 17 | 7 | 19 | 14 | 9 | 1 |
| 733 | 17 | 4 | 16 | 12 | 3 | 2 |
| 283 | 53 | 5 | 19 | 12 | 2 | 2 |
| 346 | 26 | 6 | 23 | 13 | 4 | 1 |
| 189 | 32 | 3 | 27 | 14 | 5 | 2 |
| 176 | 14 | 2 | 15 | 15 | 6 | 2 |
| 921 | 15 | 4 | 18 | 16 | 7 | 1 |

| *Mil.* | *fur.* | *po.* | *yd.* | *ft.* |
|---|---|---|---|---|
| 876 | 7 | 13 | 4 | 2 |
| 129 | 6 | 26 | 2 | 1 |
| 167 | 4 | 19 | 3 | 2 |
| 157 | 3 | 15 | 2 | 2 |
| 286 | 2 | 27 | 1 | 1 |
| 194 | 5 | 32 | 2 | 2 |
| 176 | 3 | 18 | 5 | 2 |

LAND MEASURE.

| *Acr.* | *roo.* | *per.* | *Acr.* | *roo.* | *per.* |
|---|---|---|---|---|---|
| 741 | 3 | 19 | 870 | 3 | 19 |
| 69 | 3 | 29 | 19 | 2 | 16 |
| 15 | 2 | 16 | 54 | 3 | 37 |
| 37 | 3 | 14 | 129 | 2 | 26 |
| 16 | 2 | 13 | 187 | 3 | 14 |
| 29 | 3 | 27 | 136 | 2 | 19 |

TIME.

| *Years.* | *days.* | *hrs.* | *min.* | *sec.* | *Years.* | *days.* | *hrs.* | *min.* | *sec.* |
|---|---|---|---|---|---|---|---|---|---|
| 187 | 149 | 14 | 13 | 12 | 300 | 169 | 14 | 16 | 17 |
| 146 | 126 | 16 | 16 | 16 | 19 | 187 | 17 | 16 | 16 |
| 59 | 186 | 19 | 39 | 19 | 46 | 147 | 15 | 19 | 19 |
| 28 | 140 | 21 | 46 | 35 | 87 | 196 | 23 | 46 | 47 |
| 7 | 119 | 22 | 18 | 26 | 157 | 219 | 14 | 22 | 16 |
| 146 | 146 | 19 | 57 | 19 | 46 | 138 | 15 | 42 | 13 |

## COMPOUND SUBTRACTION

Teacheth to find the inequality between numbers of divers denominations.

RULE. Having arranged the numbers so that the smaller may stand under the greater; subtract each number in the lower line from that which stands above it, and write down the remainders.

When any of the lower denominations are greater than the upper, increase the upper number by as many as make one of the next higher denomination, from which take the figure in the lower line, and set down the remainder, carry one to the next number in the lower line, and subtract as before.

FEDERAL MONEY.

| | $ | *ct.* | *m* | $ | *ct.* | *m.* | $ | *ct.* | *m.* |
|---|---|---|---|---|---|---|---|---|---|
| From | 1901 | 95 | 1 | 435 | 00 | 1 | 170 | 10 | 3 |
| Take | 992 | 97 | 2 | 9 | 15 | 9 | 9 | 50 | 2 |

### English Money.

| | £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| From | 191 | 11 | 3½ | | 304 | 19 | 8½ |
| Take | 114 | 16 | 2¼ | | 126 | 16 | 8½ |
| From | 389 | 18 | 0¼ | | 100 | 0 | 5 |
| Take | 9 | 19 | 4 | | 11 | 11 | 2¾ |

### Troy Weight.

| | lb. | oz. | dwt. | gr. | lb. | oz. | dwt. | gr. |
|---|---|---|---|---|---|---|---|---|
| From | 87 | 11 | 11 | 13 | 27 | 10 | 15 | 22 |
| Take | 19 | 11 | 14 | 22 | 15 | 9 | 16 | 23 |

### Avoirdupois Weight.

| | Ton. | cwt. | qr. | lb. | oz. | dr. | cwt. | qr. | lb. |
|---|---|---|---|---|---|---|---|---|---|
| From | 100 | 10 | 1 | 11 | 14 | 13 | 59 | 1 | 11 |
| Take | 15 | 13 | 1 | 18 | 12 | 15 | 19 | 3 | 27 |

### Apothecaries' Weight.

| | lb. | oz. | dr. | sc. | gr. | lb. | oz. | dr. | sc. | gr. |
|---|---|---|---|---|---|---|---|---|---|---|
| From | 2 | 3 | 4 | 1 | 13 | 2 | 1 | 3 | 1 | 15 |
| Take | 1 | 7 | 5 | 2 | 10 | 1 | 4 | 2 | 2 | 17 |

### Cloth Measure.

| | Yd. | qr. | nl. | E.Fl. | qr. | nl. | E.E. | qr. | nl. | E.Fr. | qr. | nl. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| From | 251 | 1 | 2 | 189 | 2 | 1 | 419 | 1 | 3 | 389 | 2 | 2 |
| Take | 127 | 3 | 3 | 120 | 2 | 2 | 174 | 3 | 2 | 189 | 5 | 3 |

### Wine Measure.

| | Tun. | hhd. | gal. | qt. | pt. | Tun. | hhd. | gal. | qt. | pt. |
|---|---|---|---|---|---|---|---|---|---|---|
| From | 591 | 1 | 13 | 1 | 1 | 800 | 1 | 50 | 2 | 1 |
| Take | 126 | 2 | 56 | 3 | 1 | 149 | 2 | 61 | 3 | 1 |

ALE AND BEER MEASURE.

| | Hhd. | gal. | qt. | pt. | Hhd. | gal. | qt. | pt. |
|---|---|---|---|---|---|---|---|---|
| From | 571 | 19 | 3 | 1 | 100 | 36 | 2 | 1 |
| Take | 198 | 53 | 2 | 1 | 9 | 27 | 3 | 1 |

DRY MEASURE.

| | Qr. | bu. | gal. | qt. | Chal. | bu. | gal. | qt. |
|---|---|---|---|---|---|---|---|---|
| From | 38 | 4 | 5 | 3 | 69 | 21 | 3 | 2 |
| Take | 17 | 5 | 1 | 2 | 49 | 33 | 5 | 3 |

LONG MEASURE.

| | Deg. | m. | fur. | p. | f. | in. | bar. | M. | fur. | p. | f. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| From | 819 | 13 | 1 | 19 | 11 | 3 | 1 | 219 | 3 | 14 | 11 |
| Take | 159 | 49 | 2 | 27 | 16 | 8 | 2 | 209 | 7 | 15 | 12 |

LAND MEASURE.

| | Acr. | roo. | per. | Acr. | roo. | pr. | Acr. | roo. | pr. |
|---|---|---|---|---|---|---|---|---|---|
| From | 591 | 1 | 11 | 501 | 3 | 13 | 219 | 2 | 21 |
| Take | 129 | 3 | 15 | 190 | 2 | 21 | 156 | 1 | 36 |

TIME.

| | Yrs. | da. | hr. | m. | sec. | Yrs. | da. | hr. | m. | sec. |
|---|---|---|---|---|---|---|---|---|---|---|
| From | 171 | 143 | 11 | 14 | 19 | 811 | 111 | 15 | 23 | 52 |
| Take | 128 | 174 | 19 | 51 | 14 | 389 | 190 | 21 | 48 | 54 |

## *PRACTICAL QUESTIONS IN COMPOUND ADDITION AND SUBTRACTION.*

1. Cast up the following sums, viz. twenty-three shillings and five pence, one pound and nine pence, seven shillings and eleven pence three farthings, twenty pounds thirteen shillings and nine pence, fifteen pence three farthings.

| | £. | s. | d. |
|---|---|---|---|
| | 1 | 3 | 5 |
| | 1 | 0 | 9 |
| | 0 | 7 | 11¾ |
| | 20 | 13 | 9 |
| | 0 | 1 | 3¾ |
| Ans. | £23 | 7 | 2½ |
| Proof | £23 | 7 | 2½ |

2. Twenty dollars and four cents, five dollars and three mills, eighty-two cents, six dollars and five mills.

Ans. 31 dols. 86 cts. 8 m.

3. Seventy dollars, three dollars and three cents, thirty-four cents and four mills, eighty dollars and a half, six dollars and a quarter.

Ans. 160 dols 12 cts. 4 mills.

4. Ten pounds and three pence, forty-five shillings and ten pence half-penny, thirty-seven shillings and four pence three farthings, nine pounds and three farthings, one shilling and six pence farthing, eighty-two shillings and four pence half-penny. Ans. £27 7s. 5¼d.

5. Thirty dollars six cents and a half, fifty-three cents and three-quarters, eleven cents and a quarter, nine dollars eleven cents and a half, fifty-four cents.

Ans. 40 dols. 37 cents.

6. Take three shillings and four pence from one pound two shillings and a penny. Ans. 18s 9d.

7. From £5 2s. 1d. take nine shillings and six pence half-penny.

Ans. £4 12s 6½d.

8. Take twenty shillings and three farthings from £8.

Ans. £6 19s. 11¼d.

9. From 18 dollars take eight mills.

Ans. 17 dols. 99 cts. 2 m.

10. Take 53 dimes from 53 eagles.

Ans. 524 dols. 7 dimes or 70 cts.

11. A merchant bought 112 bars of iron, weighing 56 cwt. 1 qr. 11lb. of which he sold 59 bars, weighing 29 cwt. 3 qrs. 21 lb. ; how many bars has he remaining, and what is the weight ?

Ans. 53 bars, weighing 26 cwt. 1 qr. 18 lb

## REDUCTION.

REDUCTION teacheth to change numbers from one denomination to another, without losing their value.

When numbers of a higher denomination are to be reduced to a lower, it is called *Reduction Descending*, and it is performed by *Multiplication*.

When numbers of a lower denomination are to be brought to a higher denomination, it is called *Reduction Ascending*, and it is performed by *Division*.

RULE. When the Reduction is Descending, multiply the highest denomination by as many of the next less as make one of the greater, adding to the product the parts of the same name, and so on to the last.

When the Reduction is Ascending, divide the given number by as many of that denomination as make one of the next higher, and so on to the denomination required, and the last quotient with the several remainders (if any) will be the answer.

The Proof is by reversing the question.

### FEDERAL MONEY.

NOTE. The higher denominations of Federal money are reduced to any lower name by annexing the ciphers in the multiplier to their number.

EXAMPLE.

How many Dollars, Dimes, Cents and Mills, in 97 Eagles?

Ans. 970 - Dollars.
9700 - Dimes.
97000 - Cents.
970000 - Mills.

### ENGLISH MONEY.

In £987 14 6¾, how many farthings?

987 14 6¾

20

19754 shillings

12

237054 pence.

4

948219 farthings

Proof.

4)948219

12)237054—3

20)19754—6

987 14 6¾

Reduce the following sums separately into farthings, viz.

| | | | | | | | *Farthings.* |
|---|---|---|---|---|---|---|---|
| £19 | 15 | 7½ | - | - | - | Ans. | |
| 7 | 0 | 11 | - | - | - | | |
| 100 | 19 | 6 | - | - | - | | |
| 0 | 19 | 4¾ | - | - | - | | |
| 17 | 17 | 4¼ | - | - | - | | |
| 146 | 12 | 9½ | | | | | 140774 |

How many £ in the following sums, viz.

| | | | | | | |
|---|---|---|---|---|---|---|
| 187 | farthings | - | - | - | - | £ |
| 1301 | pence - | - | - | - | - | |
| 773 | half pence | - | - | - | - | |
| 253 | shillings | - | - | - | - | |
| 85 | pence - | - | - | - | - | |
| | | | | | Ans. | £20 4 7¼ |

### Troy Weight.

1. In 15 lb. Troy, how many grains? Ans. 86400 grs.
2. How many ounces in 5749 dwt.? Ans. 287 oz. 9 dwt.
3. In 11 oz. 13 dwt. 13 grs. how many grains?
   Ans. 5605 grs.

### Avoirdupois Weight.

1. In 19 tons 14 cwt. 2 qrs. 19 lb. 11 oz. 13 drs. how many drams? Ans. 11316157 drs.
2. How many cwt. in 9563 lb.?
   Ans. 85 cwt. 1 qr. 15 lb.
3. In 13 cwt. 3 qrs. 21 lb. how many pounds?
   Ans. 1561 lb.

### Wine Measure.

1. In 25 tuns of wine, how many pints? Ans. 50400 pts.
2. How many hogsheads in 4935 quarts?
   Ans. 19 hhds. 36 gals. 3 qts.
3. In 3 hhds. 13 gals. 2 qts. how many half pints?
   Ans. 3240 half pints.

### Cloth Measure.

1. In 158 yards, how many nails? Ans. 2528 nails.
2. How many ells English in 5932 nails?
Ans. 296 ells 3 qrs.

### Long Measure.

1. In 29 miles, how many inches? Ans. 1837440 inches.
2. How many furlongs in 19753 yards?
Ans. 89 fur. 173 yds.
3. The length of a proposed aqueduct would be in one direction 8 ms. 2 fur. 6 perches, and in another, 7 ms. 2 fur. 20 perches. Required the difference in yards.
Ans. 1683 yards

### Time.

1. How many hours in 57 years, allowing each year to be 365 days 6 hours? Ans. 499662 hours.
2. In 57953 hours, how many weeks?
Ans. 344 w. 6 da. 17 hr.
3. How many days from the 19th of March to the 23d of September following? Ans. 188 days.

### Land Measure.

1. In 41 acres 2 roods 14 perches, how many rods?
Ans. 6654 rods or perches.
2. How many square rods in 7752 square feet?
Ans. 28 rods 129 feet.
3. In 5972 perches, how many acres?
Ans. 37 acres 1 rood 12 perches.

### Solid Measure.

1. In a pile of wood 96 feet long, 5 feet high, and 4 feet wide, how many cords? Ans. 15 cords.
2. In 82 tons of round timber, how many inches?
Ans. 5667840 inches.

When grindstones are sold by the cubic foot, the contents are thus found. To the whole diameter add half of it, and multiply the sum of these by the same half, and this product by the thickness; divide this last number by 1728, the in. in a cubic foot, and the quotient is the contents or answer required.

EXAMPLES.

What will a grindstone, weighing 375 lbs. come to at $14 per ton of 2000 lbs.?

375
14

2,000)5,250

2,625 Ans. $2,62½ cents.

How much will a stone weighing 640 lbs. come to at $14,50 per ton?

640
14½

8960
320

2,000)9,280

4,640 Ans. $4,64 cents.

## *AMERICAN CURRENCIES.*

The dollar is rated differently in several of the states. This difference is owing to the depreciation of their currencies previous to the revolution.

| | | | |
|---|---|---|---|
| In New England, Virginia, Kentucky, Tennessee, and Ohio, the dollar is - | 6*s* or $3⅓ | to £1 | |
| New York and North Carolina, - - | 8*s* | 2½ | 1 |
| New Jersey, Pennsylvania, Delaware, and Maryland, - - | 7*s*6 | 2⅔ | 1 |
| South Carolina and Georgia, - - | 4*s*8 | 30 | 7 |
| Canada and Nova Scotia, - - | 5*s* | 4 | 1 |
| Newfoundland, like Sterling, - - | 4*s*6 | 40 | 9 |

*To change New England and Virginia currency to Federal money, the dollar being* 6 *shillings.*

RULE. As the value of a dollar is equal to three tenths of of a pound, when pounds are given to be changed, annex three ciphers to the sum, and divide the whole by 3; the quotient is the answer in cents.

EXAMPLE.

Change £523 to Federal money.

3)523000

174333⅓ cents. Ans. 1743 dols. 33⅓ cts.

When pounds and shillings are given, to the pounds annex half the number of shillings and two ciphers, if the number of shillings in the given sum be even; but if the number be odd, annex half the number, and then 5 and one cipher, and divide by 3: the quotient is the answer in cents.

EXAMPLES.

1. Change £59 18*s*. to Federal money.

3)59900

19966⅔ cents. Ans. 199 dols. 66⅔ cts.

2. Change £93 13*s*. to Federal money.

3)93650

31216⅔ cents. Ans. 312 dols. 16⅔ cts.

When there are shillings, pence, &c. in the given sum, annex for the shillings as before directed, and to these add the farthings in the given pence and farthings, observing to increase their number by one when they exceed 12, and by two when they exceed 37, and divide as before.

EXAMPLES.

1. Change £21 8*s*. 4½*d*. to Federal money.

3)21419

7139⅔ cts.

4 is annexed to the pounds for half the shillings, and 19 for the farthings in 4½*d*. and excess of 12.

Ans. 71 dols. 39⅔ cts.

2. Change £117 16*s*. 2*d*. to Federal money.

3)117808

39269⅓ cts. Ans. 392 dols. 69⅓ cts.

3. Change £721 9*s*. 11¼*d*. to Federal money.

3)721497

240499 cts.

In this example 4[illegible]s annexed to the pounds for half the even shillings, and 47 for the farthings in 11¼*d*. and excess of 37, and then 5 is added to the figure next to half the shillings, make it 9, in place of 4 for the odd shilling.

Ans. 2404 dols. 99 cts

4. Change £29 11*s*. 2½*d*. to Federal money.

3)29559

9853 cts. Ans. 98 dols. 53 cts.

### *To change Federal Money to New-England and Virgi Currency.*

Rule. When the sum is dollars only, multiply it by 3, a double the first figure of the product for shillings, and t rest of the product will be pounds.

When there are cents in the given sum, multiply the wh by 3, and cut off three figures of the product to the right ha as a remainder.

Multiply this remainder by 20, and cut off as before.

Proceed in this manner through the several parts of pound, and the numbers standing on the left hand make t answer in the several denominations.

Note. If there be mills, cut off four figures, and proceed as above.

Example.

1. Change 872 dollars to New-England currency.

872
3

26112

Ans. £261 12*s*.

2. Change 1971 dollars 96¾ cents to Massachusetts currency.

1971 96¾
3

£591,590
20

*s*.11,800
12

*d*.9,600
4

*f*.2,400

Ans. £591 11 9½.

3. Reduce 1259 dollars cents and 7 mills to Mas chusetts currency.

1259 89 7
3

£377,9691
20

*s*.19,3820
12

*d*.4,5840
4

*f*.2,3360

Ans. £377 19 4½.

*To change New-York and North-Carolina Currency to Federal Money, the dollar being 8 shillings.*

RULE. Prepare the given sum by the rule for New-England money, and divide by 4; the quotient is the answer in cents.

EXAMPLES.

1. Change £461 to Federal money.

4)461000

115250 cts. Ans. 1152 dols. 50 cts.

2. Change £419 10*s.* 8¼*d.* to Federal money.

4)419535

104883¾ cts. Ans. 1048 dols. 83¾ cts.

*To change Federal Money to New-York and North-Carolina Currency.*

RULE. As for Massachusetts currency, using 4 as a multiplier instead of 3; the value of a dollar being equal to four tenths of a pound.

EXAMPLES.

1. Change 1684 dollars to New-York and North-Carolina currency.

1684
4

Ans. £673 12

2. Change 1048 dols. 83¾ cents to New-York currency.

1048,83¾
4

419,535
20

10,700
12

8,400
4

1,600 Ans. £419 10*s.* 8¼*d.*

*To change New-Jersey, Pennsylvania, Delaware, and Maryland Currency, to Federal Money, the Dollar being 7s. 6d.*

RULE. As the value of a dollar is equal to $\frac{8}{3}$ of a pound, multiply the given sum, when it is pounds only, by 8, and divide by 3 for dollars. If there be shillings, &c. increase the sum in pence by $\frac{1}{3}$ of the whole sum for cents.

EXAMPLES.

1. Change £471 to Federal money.

471
8

3)3768

Ans. 1256 dollars.

2. Change £480 19*s.* 9*d.* to Federal money.

480 19 9
20

9619
12

3)115437
12826$\frac{1}{3}$

128263$\frac{3}{4}$ cents. Ans. 1282 dols. 63$\frac{3}{4}$ cts.

*To change Federal Money to New-Jersey, Pennsylvania, Delaware and Maryland Currency.*

RULE. Multiply the sum, when in dollars, by 3, and divide by 8 for pounds. If there be dollars and cents, multiply the given sum by 90, and the product, (rejecting two figures on the right) is pence, or deducting $\frac{1}{10}$ of the sum, gives the penco likewise.

EXAMPLES.

1. Change 1256 dollars to Pennsylvania currency.

1256
3

8)3768

Ans. £471

2. Change 1282 dols. 63½ cents to Pennsylvania currency

| | | Or $\frac{1}{10}$ | |
|---|---|---|---|
| 128263½ | | | 128263½ |
| 90 | | | |
| 12)115437,00 | | 12)115437 | |
| 20)9619—9 | | 20)9619—9 | |
| Ans. £480 19 9. | | Ans. £480 19 9 as before. | |

*To change South-Carolina and Georgia Currency to Federal Money, the dollar being 4s. 8d.*

RULE. As the value of a dollar is equal to $\frac{7}{30}$ of a pound, if the sum be pounds only, multiply it by 30, and divide by 7 for dollars. If there be shillings, &c. annex two ciphers to the pence in the given sum, and divide by 56, the pence in a dollar, the quotient is the answer in cents.

EXAMPLES.

1. Change £28 to Federal money.

28
30
7)840
120 Ans. 120 dols.

2. Change £11 4s. 8d. to Federal money

11 4 8
20
224
12
8×7=56 8)269600
7)33700
4814$\frac{2}{7}$ Ans. 48 dols. 14$\frac{2}{7}$ cts.

*To change Federal Money to South-Carolina and Georgia Currency.*

RULE. Multiply the dollars by 7, and divide by 30 for pounds. If there be dollars and cents, multiply by 56, and the product (rejecting two figures on the right) is the answer in pence.

EXAMPLES.

1. Change 540 dols. to S. Carolina and Georgia curr

540
7

3,0)378,0

Ans. £126

2. Change 48 dols. 14¼ cts. to South-Carolina curr

48 14¼
56

28884
24070
16

12)2696,00

20)224—8

11 4 8

56
2

7)112
16

Or 7)56

8×2=16.

Ans. £11 4 (

In like manner may Newfoundland money or Sterling reduced, using 54*d.* instead of 56, and the proportion as to $40.

*To change Canada and Nova-Scotia Currency to Fed Money, the dollar being 5s.*

RULE. As the value of a dollar is equal to one-fourth a pound, multiply the sum, when in pounds, by 4, dollars.

When there are shillings, &c. reduce the given sum pence, annex two ciphers, and divide by 60, for cents.

EXAMPLES.

1. Change £36 Canada currency to Federal money.

36
4

Ans. 144 dols.

2. Change £528 12s. 6d. Canada currency to Federal money.

| | | Or thus, | |
|---|---|---|---|
| £528 12 6 | | 528 | |
| 20 | | 4 $ per £ | |
| 10572 | | 2112 | |
| 12 | | 10s.= 2 | |
| 6,0)1268700,0 | | 2s. 6d.= 0 50 | |
| 211450 cents. | | 2114 50 | |
| | | Ans. 2114 dols. 50 cents. | |

*To change Federal Money to Canada and Nova-Scotia Currency.*

RULE. Divide the sum in dollars by 4, for pounds.

If there be dollars and cents, multiply the given sum by 60, and the product (rejecting two figures on the right) is the answer in pence.

EXAMPLES.

1. Change 144 dollars to Canada currency.

4)144

Ans. £36

2. Change 2114 dollars 50 cents to Canada or Nova-Scotia currency.

2114,50
60

12)126870,00

2,0)1057,2 6

528 12 6 Ans. £528 12s. 6d.

3. Change £364 6s. 4d. of the preceding currencies to Federal money.

| | | |
|---|---|---|
| Ans. $1214,39 | at 6s. | to the dollar. |
| 910,79 | 8s. | " |
| 971,51 | 7s. 6d. | " |
| 1561,35 | 4s. 8d. | " |
| 1457,26 | 5s | " |
| 1619,18 | 4s. 6d. | " |

## A TABLE for changing Shillings and Pence of New-England and Virginia into Cents and Mills.

| | | 1s. | 2s. | 3s. | 4s. | 5s. |
|---|---|---|---|---|---|---|
| Pence. | Cts. m. | Cts. m. | Cts. m. | Cts. m. | Cts. m. | Cts. m. |
| 0 | | 16 7 | 33 3 | 50 0 | 66 7 | 83 3 |
| 1 | 1 4 | 18 1 | 34 7 | 51 4 | 68 1 | 84 7 |
| 2 | 2 8 | 19 5 | 36 1 | 52 8 | 69 5 | 86 1 |
| 3 | 4 2 | 20 9 | 37 5 | 54 2 | 70 9 | 87 5 |
| 4 | 5 6 | 22 3 | 38 9 | 55 6 | 72 3 | 88 9 |
| 5 | 7 0 | 23 7 | 40 3 | 57 0 | 73 7 | 90 3 |
| 6 | 8 3 | 25 0 | 41 7 | 58 3 | 75 0 | 91 7 |
| 7 | 9 7 | 26 4 | 43 0 | 59 7 | 76 4 | 93 0 |
| 8 | 11 1 | 27 8 | 44 4 | 61 1 | 77 8 | 94 4 |
| 9 | 12 5 | 29 2 | 45 8 | 62 5 | 79 2 | 95 8 |
| 10 | 13 9 | 30 6 | 47 2 | 63 9 | 80 6 | 97 2 |
| 11 | 15 3 | 32 0 | 48 6 | 65 3 | 82 0 | 98 6 |

## A TABLE for reducing Shillings and Pence of the different Currencies to Cents and Mills.

| | At 8s. | 7s. 6d. | 6s. | 4s. 8d. | 5s. | 4s. 6d. |
|---|---|---|---|---|---|---|
| Shill. | Cts. m. | Cts. m. | Cts. m. | Cts. m. | Cts. m. | Cts. m. |
| 10 | 125 0 | 133 3 | 166 7 | 214 3 | 200 0 | 222 2 |
| 9 | 112 5 | 120 0 | 150 0 | 192 8 | 180 0 | 200 0 |
| 8 | 100 0 | 106 7 | 133 3 | 171 4 | 160 0 | 177 7 |
| 7 | 87 5 | 93 4 | 116 7 | 150 0 | 140 0 | 155 5 |
| 6 | 75 0 | 80 0 | 100 0 | 128 6 | 120 0 | 133 3 |
| 5 | 62 5 | 66 7 | 83 3 | 107 1 | 100 0 | 111 1 |
| 4 | 50 0 | 53 4 | 66 7 | 85 7 | 80 0 | 88 8 |
| 3 | 37 5 | 40 1 | 50 0 | 64 3 | 60 0 | 66 6 |
| 2 | 25 0 | 26 7 | 33 3 | 42 9 | 40 0 | 44 4 |
| 1 | 12 5 | 13 4 | 16 7 | 21 4 | 20 0 | 22 2 |
| Pence 11 | 11 5 | 12 2 | 15 3 | 19 5 | 18 3 | 20 4 |
| 10 | 10 4 | 11 1 | 13 9 | 17 9 | 16 7 | 18 5 |
| 9 | 9 4 | 10 0 | 12 5 | 16 1 | 15 0 | 16 7 |
| 8 | 8 3 | 8 9 | 11 1 | 14 3 | 13 3 | 14 8 |
| 7 | 7 3 | 7 8 | 9 7 | 12 5 | 11 7 | 13 0 |
| 6 | 6 3 | 6 7 | 8 3 | 10 7 | 10 0 | 11 1 |
| 5 | 5 3 | 5 6 | 7 0 | 8 9 | 8 3 | 9 3 |
| 4 | 4 1 | 4 5 | 5 6 | 7 1 | 6 7 | 7 4 |
| 3 | 3 1 | 3 4 | 4 2 | 5 3 | 5 0 | 5 5 |
| 2 | 2 0 | 2 2 | 2 8 | 3 6 | 3 3 | 3 7 |
| 1 | 1 0 | 1 1 | 1 4 | 1 8 | 1 7 | 1 8 |

## COMPOUND MULTIPLICATION

Is the multiplying of numbers of different denominations by a simple figure or figures, whose product shall be equal to a proposed number or numbers.

RULE. Write the multiplier under the lowest denomination of the multiplicand; multiply every number of the multiplicand by the multiplier, and bring the several products as they occur to the next higher denomination; write down the remainders, and carry the integers to the next product.

EXAMPLES OF MONEY.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1. Multiply | £191 | 17 | 8½ | | £913 | 11 | 9¾ |
| by | | | 2 | | | | 5 |
| Ans. | £383 | 15 | 5 | | £4567 | 19 | 0¾ |
| | £2 | 6 | 7½ | | £2 | 6 | 7½ |
| | | | 9 | | | | 5 |
| | 20 | 19 | 7½ | | | | |
| | | | 5 | | | | 7 |
| | 104 | 18 | 1½ | | | | |
| | | | 7 | | | | 11 |
| | 734 | 6 | 10½ | | | | |
| | | | 11 | | | | 9 |
| | £8077 | 15 | 7½ | | £3077 | 15 | 7½ |

2. What will 7 yards of shalloon come to at 3*s.* 5*d.* per yard?

| | | | |
|---|---|---|---|
| | 3 | 5 | |
| | | 7 | |
| Ans. | £1 | 3 | 11 |

| | | | | | |
|---|---|---|---|---|---|
| 3. 4 yards at | 6*s.* | 8*d.* | - - - - - - | Ans. £1 | 6 8 |
| 4. 5 " | 5*s.* | 9*d.* | - - - - - - - | 1 | 8 9 |
| 5. 7 " | 19*s.* | 6*d.* | - - - - - - | 6 | 16 6 |

If the number or quantity exceed 12, and is to be found in the table, multiply by its component parts.

EXAMPLES.

1. 14 yards at 9 $5\frac{1}{2}$ per yard.

2

18 11 price of 2 yards.

7

Ans. £6 12 5 price of 14 yards.

2. 16 yards at 4*s.* 9*d.* Ans. £3 16 0
3. 28 lbs. at 6*s.* $5\frac{3}{4}d.$ 9 1 $8\frac{1}{2}$
4. 144 g's, at 5*s.* $7\frac{3}{4}d.$ 40 13 0

*To multiply by fractional parts, as* $\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, *&c.*

RULE. Multiply the price by the upper figure of the fraction, and divide the product by the lower, the quotient will be the answer; but when the upper figure is not more than one, dividing the price or sum by the lower figure gives the answer.

EXAMPLES.

1. What is $\frac{3}{8}$ of a yard of cambric worth, at 12*s.* 6*d.* per yard?

12 6

3

8)37 6

Ans. 4*s.* $8\frac{1}{4}d.$

2. What is $\frac{3}{4}$ of a yd. of broadcloth worth, at 35*s.* per yd.?

35 Or thus, 2)35

3

2)17 6 price of half a yard.

4)105 8 9 " a quarter.

Ans. 26*s.* 3*d.* 26 3

3. One quarter of a yard of fine linen, at 7*s.* 6*d.* per yard?

4)7 6

Ans. 1*s.* $10\frac{1}{2}d.$

4. Multiply £9 6*s.* 8*d.* by $\frac{7}{8}$, or take $\frac{7}{8}$ of it.

9 6 8 Or thus, $\frac{1}{8}$)9 6 8

7

1 3 4 for $\frac{1}{8}$

8)65 6 8 7

Ans. £8 3 4 £8 3 4 for $\frac{7}{8}$

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5. | $\frac{1}{4}$ | yard | at | 4s. | 3d. | - | - | - | - | - | - | - | - | £0 | 1 | $0\frac{3}{4}$ |
| 6. | $\frac{1}{2}$ | - | - | 5s. | 9d. | - | - | - | - | - | - | - | - | 0 | 2 | $10\frac{1}{2}$ |
| 7. | $\frac{3}{4}$ | - | - | 8s. | 4d. | - | - | - | - | - | - | - | - | 0 | 6 | 3 |
| 8. | $3\frac{1}{4}$ | yards | | 4s. | 3d. | - | - | - | - | - | - | - | - | 0 | 13 | $9\frac{3}{4}$ |
| 9. | $7\frac{1}{2}$ | - | - | 5s. | 9d. | - | - | - | - | - | - | - | - | 2 | 3 | $1\frac{1}{2}$ |
| 10. | $11\frac{3}{4}$ | - | - | 8s. | 4d. | - | - | - | - | - | - | - | - | 4 | 17 | 11 |
| 11. | $9\frac{1}{4}$ | - | - | 7s. | 3d. | - | - | - | - | - | - | - | - | 3 | 7 | $0\frac{3}{4}$ |
| 12. | $25\frac{1}{4}$ | - | - | 7s. | 9d. | - | - | - | - | - | - | - | - | 9 | 15 | $8\frac{1}{4}$ |
| 13. | $19\frac{3}{4}$ | - | - | 23s. | 3d. | - | - | - | - | - | - | - | - | 22 | 19 | $2\frac{1}{4}$ |
| 14. | $56\frac{1}{8}$ | - | - | 12s. | 4d. | - | - | - | - | - | - | - | - | 34 | 12 | $2\frac{1}{2}$ |
| 15. | $11\frac{3}{8}$ | - | - | 17s. | 6d. | - | - | - | - | - | - | - | - | 9 | 19 | $0\frac{3}{4}$ |

When the quantity, or multiplier, cannot be produced by using small numbers, the calculation is usually made in the following manner:

EXAMPLE.

4568 yards at 7s. $1\frac{3}{4}$d. per yard.

10

3 11 $5\frac{1}{2}$ price of 10 yards.

10

35 14 7 - - 100 "

10

357 5 10 - - 1000 "

4

| | | | | | |
|---|---|---|---|---|---|
| 1429 | 3 | 4 | - - | 4000 | " |
| 178 | 12 | 11 | - - | 500 | " |
| 21 | 8 | 9 | - - | 60 | " |
| 2 | 17 | 2 | - - | 8 | " |

Ans. £1632 2 2 for 4568

This is the usual method in schools, but in business it is thus calculated:

| | | | | | |
|---|---|---|---|---|---|
| 4568 yards at | 7s. | - - - - - | 31976s. | 0d. | |
| " | 1d. | - - - - - | 380 | 8 | |
| " | $\frac{1}{2}$d. | - - - - - | 190 | 4 | |
| " | $\frac{1}{4}$d. | - - - - - | 95 | 2 | |
| | | | 2,0)32642 | 2 | |
| | | | £1632 | 2 | 2 as before. |

## *BILL OF PARCELS.*

———, *August* 15, 1831.

*Mr. A. B.*

*Bought of G. & H.* - - *No.* 10, ——— *Street.*

| | | | | |
|---|---|---|---|---|
| 8 | pair worsted hose | - | at 4*s.* 6*d.* | - $6,00 |
| 5 | do. thread do. | - | 3*s.* 2*d.* | - 2,64 |
| 3 | yds. kerseymere | - | 14*s.* | - 7,00 |
| 6 | do. muslin - | - | 4*s.* 2*d.* | - 4,16 |
| 2 | do. tammy - | - | 1*s.* 8*d.* | - 0,56 |
| 4 | shawls - - | - | 7*s.* 6*d.* | - 5,00 |
| 64½ | yds. striped nankins | - | 2*s.* | - 21,50 |
| 32 | ells mode - | - | 3*s.* | - 16,00 |
| 28½ | yds. calico - | - | 2*s.* 4*d.* | - 11,08 |
| 2 | gross gilt coat buttons | | 18*s.* 6*d.* | - 6,17 |
| 3 | pieces russel - | - | 34*s.* | - 17,00 |
| 2 | pieces muslin - | - | 30*s.* | - 10,00 |
| 25 | yds. Irish linen - | - | 2*s.* | - 8,33 |
| 28½ | yds. stormount calico | - | 2*s.* 6*d.* | - 11,88 |
| 28½ | do. red do. | - | 2*s.* 2*d.* | - 10,29 |
| 1 | piece durant - | - | 56*s.* | - 9,33 |
| 2 | pieces blue shalloon | - | 57*s.* 6*d.* | - 19,17 |
| 50½ | yds. dimity - | - | 2*s.* 6*d.* | - 21,04 |
| 3 | pieces persian - | - | 84*s.* | - 42,00 |

| | |
|---|---|
| Amount at 6*s.* to the dollar - - | $229,15 |
| 8*s.* - - - - - - | 171,86 |
| 7*s.* 6*d.* - - - - - - | 183,32 |
| 4*s.* 8*d.* - - - - - - | 294,62 |

## *WEIGHTS AND MEASURES.*

| | *lb.* | *oz.* | *dwt.* | *grs.* |
|---|---|---|---|---|
| Multiply | 14 | 9 | 14 | 17 |
| by | | | | 5 |
| Product | 74 | 0 | 13 | 13 |

| *T.* | *cwt.* | *qrs.* | *lbs.* |
|---|---|---|---|
| 19 | 17 | 3 | 25 |
| | | | 9 |

| *lb.* | *oz.* | *dwt.* | *grs.* |
|---|---|---|---|
| 825 | 8 | 19 | 22 |
| | | | 8 |
| 6605 | 11 | 19 | 8 |

| *Cwt.* | *qr.* | *lbs.* | *oz.* | *dr.* |
|---|---|---|---|---|
| 17 | 1 | 14 | 11 | 14 |
| | | | | 7 |

| | T. | hhd. | gal. | | T. | p. | hhd. | gal. |
|---|---|---|---|---|---|---|---|---|
| Multiply | 87 | 1 | 57 | | 28 | 1 | 1 | 62 |
| by | | | 5 | | | | | 7 |
| Product | | | | | | | | |

What is the weight of 47 casks of rice, each weighing 2 cwt. 1 qr. 23 lbs.? Ans. 115 cwt. 1 qr. 17 lbs.

## COMPOUND DIVISION

Teacheth to find how often one number is contained in another of different denomination.

RULE. Begin at the left hand, and divide each denomination by the divisor, setting down the quotients under ther respective dividends. But if there be a remainder after dividing any of the denominations except the least, find how many of the next lower denomination it is equal to, and add it to the number, if any, which was in this denomination before, then divide the sum as usual, and so on till the whole is finished.—The method of proof is the same as in Simple Division.

EXAMPLES OF MONEY.

Divide £19 14 9½ by 2.

2)19 14 9½

Ans. £9 17 4¾

4)2354 12 6

9)588 13 1½

7)65 8 1½

5)9 6 10½

Ans. £1 17 4½

Divide £900 11 9¾ by 3.

3)900 11 9¾

£300 3 11¼

5)2354 12 6

9)

7)

4)

Ans. £1 17 4½

*If the divisor exceed* 12, *and it be found in the table, divide by its component parts.*

EXAMPLES.

1 Divide £278 8*s.* 9*d.* between 45 men equally.

5)278 8 9

9)55 13 9

Ans. £6 3 9 to each.

2. If 108 yards cost £45 13*s*. 6*d*. what is it per yard?
Ans. 8*s*. 5½*d*.

3. If 1000 gallons of molasses cost £209 7*s*. 6*d*. how much is it per gallon? Ans. 4*s*. 2¼*d*.

*If the divisor cannot be found by the multiplication of small numbers, as in the preceding examples, divide by it as in the following*

EXAMPLES.

1. Divide £46 1*s*. 11*d*. by 37.

37)46 1 11(£1
37
—
9
20
—
37)181(4*s*.
148
—
33
12
—
37)407(11*d*.
407
—

Ans. £1 4*s*. 11*d*.

2. Divide £33 13*s*. 8½*d*. by 23. Ans. £1 9*s*. 3½*d*.

3. If 345 quintals of fish cost £409 13*s*. 9*d*. how much is it per quintal? Ans. £1 3*s*. 9*d*.

4. If 4568 yards of cloth cost £1632 2*s*. 2*d*. how much is it per yard? Ans. 7*s*. 1¾*d*.

1. When the divisor is 1, with one or more ciphers, cut off the ciphers in the divisor, and the same number of figures from the right hand of the integers of the dividend for a remainder, reduce this remainder to the next lower name, and take in those numbers of the dividend which are of the same denomination: proceed in this manner to the least name, and the several quotients taken together, will be the answer. When the question is in Federal money, the answer is found as in Simple Division. This method of dividing applies to all questions of Interest, Commission, Buying and Selling of Stocks, &c. when the rate is at so much per cent. or 100.

EXAMPLES.

Divide £788 19*s.* 2*d.* equally between 100 men.

100)7,88 19 2
20
17,79
12
9,50
4
2,00
Ans. £7 17*s.* 9½*d.*

What is the commission on £448 1*s.* 11¾*d.* at 4 per cent?

448 1 11¾
4
100)17,92 7 11
20
18,47
12
5,75
4
3,00
Ans. £17 18 5¾.

What is the interest of $1473 for one year, at 6 per cent?

1473
6 cts. per $.
8838 cts.
Ans. $88,38 cts.

Divide the following sums severally by 100.

£955 10 5 Ans. £9 11 1½
1776 17 6 - 17 15 4½
3888 12 11 - 38 17 8¾
$738,50 cts. - $7,38,5
1111,95 " - 11,11,9½
1923,75 " - 19,23,7½

*Having the price of a cwt. to know how much it is per lb.*

2. RULE. Find the price of 1 or 2 quarters, and then divide by the component parts.

If 5 cwt. of iron cost £8 15*s.* 0*d.* how much is it per lb.?

5)8 15 0
4)1 15 0 price of 1 cwt.

28 = { 4)0 8 9 - - 1 quarter.
7)0 2 2¼

Ans. £0 0 3¾ - - 1 lb.

If ⅝ of a farm is worth $450, what is the whole valued at? Ans. $1200.

## DECIMAL FRACTIONS.

A DECIMAL FRACTION is that, whose denominator is an unit, with as many ciphers annexed to it as the numerator has places, and is usually expressed by writing the numerator only, with a point before it, called the separatrix; thus, $\frac{5}{10}$, $\frac{25}{100}$, $\frac{125}{1000}$, are decimal fractions, and are expressed by ,5 ,25 ,125 respectively.

The figures to the left hand of the separatrix are whole numbers; thus 4,5 yards is 4 yards and 5 tenths, or one half of another yard.

Ciphers, placed to the right hand of decimals, make no alteration in their value; for ,5 ,50 ,500, &c. are decimals of the same value, being each equal to $\frac{1}{2}$; but when placed to the left hand, the value of the fraction is decreased in a ten-fold proportion; thus ,5 ,05 ,005, &c. are 5 tenth parts, 5 hundredth parts, 5 thousandth parts, respectively.

The different value of figures will appear plainer by the following

TABLE.

| INTEGERS. | | | | | | | | | DECIMALS. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2 | , | | | | | | | | | |
| | | | | | | 2 | 0 | , | 2 | | | | | | | | |
| | | | | | 2 | 0 | 0 | , | 0 | 2 | | | | | | | |
| | | | | 2 | 0 | 0 | 0 | , | 0 | 0 | 2 | | | | | | |
| | | | 2 | 0 | 0 | 0 | 0 | , | 0 | 0 | 0 | 2 | | | | | |
| | | 2 | 0 | 0 | 0 | 0 | 0 | , | 0 | 0 | 0 | 0 | 2 | | | | |
| | 2 | 0 | 0 | 0 | 0 | 0 | 0 | , | 0 | 0 | 0 | 0 | 0 | 2 | | | |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | , | 0 | 0 | 0 | 0 | 0 | 0 | 2 | | |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | , | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | |
| hundreds of millions. | tens of millions. | millions. | hundreds of thousands. | tens of thousands. | thousands. | hundreds. | tens. | units. | tenths. | hundredths. | thousandths. | ten thousandths. | hundred thousandths. | millionths. | ten millionths. | hundred millionths. | |

From this table it appears, that as whole numbers increase in a ten-fold proportion from units to the left hand, so decimals decrease in the same proportion to the right: and that in decimals, as in whole numbers, the place of a figure determines its relative value.

*Examples for writing Decimals.*

| | |
|---|---|
| Five tenths | ,5 |
| Five hundredths | ,05 |
| Five thousandths | ,005 |
| Five hundred thousandths | ,00005 |
| Fifty-three thousandths | ,053 |
| Five, and fifteen hundredths | 5,15 |
| Fifteen millionths | ,000015 |
| Eight hundred and nine thousandths | ,809 |
| Eight hundreds, and nine thousandths | 800,009 |
| Eighteen hundred thousandths | ,00018 |
| One, and one hundredth | 1,01 |
| Four hundred and forty-one millionths | ,000441 |
| Four hundreds, and forty-one millionths | 400,000041 |

## *ADDITION OF DECIMALS.*

Rule. Place the given numbers so that the decimal points may stand directly under each other, then add as in whole numbers, and point off so many places for decimals to the right as are equal to the greatest number of the decimal places in any of the given numbers.

Examples.

| | | |
|---|---|---|
| 263,51 | 42,23 | 2,1 |
| 149,28 | 18,47 | ,5 |
| 293,53 | 9,3 | 26,17 |
| 184,59 | 52,384 | ,7 |
| 129,4 | 2,1 | 5, |
| 1020,31 | 124,484 | 34,47 |

Required the sum of twenty-nine and three-tenths, three hundred and seventy-four and nine millionths, ninety-seven and two hundred and fifty-three thousandths, three hundred and fifteen and four hundredths, twenty-seven, one hundred and four tenths. Ans. 942,993009.

Required the sum of ten dollars and twenty-nine cents, ninety-three cents and three mills, nine cents and six mills, and two dollars and eight mills.

Ans. 13 dols. 32 cts. 7 mills.

## *SUBTRACTION OF DECIMALS.*

RULE. Place the given numbers so that the decimal point may stand directly under each other, and then point off the decimal places as in addition.

EXAMPLES.

| | | | | |
|---|---|---|---|---|
| From | 219,42 | 87,26 | 57, | 311, |
| Take | 184,38 | 19,4 | 9,375 | 11,11 |
| | 35,04 | 67,86 | 47,625 | 299,89 |

From two thousand and sixteen hundredths take one thousand and four, and four millionths. Ans. 996,159996.

From twenty-four thousand nine hundred and nine and one tenth take fourteen thousand and twenty-nine thousandths. Ans. 10909,071.

Take eighty-five and seven hundred and thirty-seven thousandths from one hundred. Ans. 14,263.

From five hundred and thirty-one dollars two cents take one hundred and seventeen dollars three cents and four mills. Ans. 413 dols. 98 cts. 6 mills.

## *MULTIPLICATION OF DECIMALS.*

Multiply exactly as in whole numbers, and from the product cut off as many figures for decimals to the right hand as there are decimals in both factors; but if the product should not have so many, supply the defect by prefixing ciphers.

EXAMPLES.

| | | | | |
|---|---|---|---|---|
| Multiply | 36,5 | 29,831 | | 3,92 |
| by | 7,27 | ,952 | | 196 |
| | 2555 | 59662 | | 2352 |
| | 730 | 149155 | | 3528 |
| | 2555 | 268479 | | 392 |
| Product | 265,355 | 28,399112 | | 768,32 |
| Multiply | ,285 | ,285 | ,29 | 124 |
| by | ,8 | ,003 | ,1 | ,06 |
| Product | ,2280 | ,000855 | ,029 | 7,44 |

NOTE. To multiply decimal fractions by 10, 100, 1000, &c. is only to remove the separatrix so many places towards the right as there are ciphers.

Thus, 7,362937 multiplied by $\left\{\begin{matrix}10\\100\\1000\\10000\end{matrix}\right\}$ is $\left\{\begin{matrix}73,62937\\736,2937\\7362,937\\73629,37\end{matrix}\right.$

Multiply twenty-nine and three tenths by seventeen.
Ans. 498,1.

Multiply twenty-seven thousandths by four hundredths.
Ans. ,00108.

Multiply two thousand and four and two tenths by twenty-seven. Ans. 54113,4.

## *DIVISION OF DECIMALS.*

RULE. Divide as in whole numbers, and from the right hand of the quotient point off as many places for decimals as the decimal places in the dividend exceed those of the divisor. If the places of the quotient are not so many as the rule requires, supply the defect by prefixing ciphers. If at any time there be a remainder, or the decimal places in the divisor are more than those in the dividend, ciphers may be annexed to the dividend, and the quotient carried to any degree of exactness.

EXAMPLES.

| 92),863972(,009391 | ,853)89,000 (104,337, &c. |
|---|---|
| 828 | 853 |
| 359 | 3700 |
| 276 | 3412 |
| 837 | 2880 |
| 828 | 2559 |
| 92 | 3210 |
| 92 | 2559 |
| | 6510 |
| | 5971 |
| | 539 |

The various kinds that ever occur in division are included in the following cases, viz.

| | | | | |
|---|---|---|---|---|
| Divide ,803 | by | ,22 | Ans. | 3,65 |
| 8,03 | | 2,2 | | ,365 |

| | | | | | |
|---|---|---|---|---|---|
| Divide | ,803 | by | 22 | Ans. | ,0365 |
| | 80,3 | | ,22 | | 365 |
| | 80,3 | | 2,2 | | 36,5 |
| | 80,3 | | 22 | | 3,65 |
| | 222 | | ,365 | | 608,21+ |
| | 222 | | 3,65 | | 60,821+ |
| | 222 | | 365 | | ,60821+ |

As multiplying by 10, 100, 1000, &c. is only removing the separating point of the multiplicand so many places to the right hand, as there are ciphers in the multiplier, so to divide by the same is only removing the separatrix, in the same manner, to the left.

## *REDUCTION OF DECIMALS.*

### Case I.

*To reduce a vulgar fraction to its equivalent decimal.*

Rule. Divide the numerator by the denominator, and the quotient will be the decimal required.

Examples.

1. Reduce $\frac{3}{4}$ to a decimal.

4)3,00

Ans. ,75

2. What is the decimal of $\frac{1}{2}$ ? Ans. ,5.
3. What is the decimal of $\frac{1}{4}$ ? Ans. ,25.
4. What is the decimal of $\frac{3}{20}$ ? Ans. ,15.
5. What is the decimal of $\frac{17}{25}$ ? Ans. ,68.
6. Express $\frac{7}{8}$ decimally. Ans. ,875.

### Case II.

*To reduce numbers of different denominations to their equivalent decimal values.*

Rule. 1. Write the given numbers perpendicularly under one another for dividends, proceeding orderly from the least to the greatest.

2. Opposite to each dividend, on the left hand, place such a number for a divisor as will bring it to the next superior name, and draw a line between them.

3. Begin with the highest, and write the quotient of each division, as decimal parts, on the right hand of the dividend next below it, and the last quotient will be the decimal sought.

EXAMPLES.

1. Reduce 14*s.* 5½*d.* to the decimal of a pound.

| | |
|---|---|
| 4 | 2 |
| 12 | 5,5 |
| 20 | 14,4583 |

Ans. ,7229

2. Reduce 15*s.* to the decimal of a pound. Ans. ,75.
3. Reduce 3 qrs. 18 lbs. to the decimal of a cwt. Ans. ,910714+
4. Reduce 2 qrs. 2 nails to the decimal of a yard. Ans. ,625.
5. Reduce 14 gals. 3 quarts to the decimal of a hogshead. Ans. ,2341+

CASE III.

*To find the decimal of any number of shillings, pence, and farthings, by inspection.*

RULE. Write half the greatest even number of shillings for the first decimal figure, and let the farthings, in the given pence and farthings, possess the second and third places; observing to increase the second place by 5, if the shillings be odd, and the third place by 1, when the farthings exceed 12, and by 2 when they exceed 37.

EXAMPLES.

1. Find the decimal of 13*s.* 9¾*d.* by inspection.

| | |
|---|---|
| ,6 | half of 12*s.* |
| 5 | for the odd shilling. |
| 39 | farthings in 9¾*d.* |
| 2 | for excess of 37. |

Ans. ,691

2. Find by inspection the decimal of 15*s.* 8½*d.* 9*s.* 3½*d.* 19*s.* 6¾*d.* 3*s.* 6*d.* and 2*s.* 11½*d.* Ans. ,784 ,465 ,978 ,175 ,148.

CASE IV

*To find the value of any given decimal in the terms of the integer.*

RULE. 1. Multiply the decimal by the number of parts in the next lowest denomination, and cut off as many places for the remainder to the right hand as there are places in the given decimal.

2. Multiply the remainder by the parts in the next inferior denomination, and cut off a remainder as before.

3. Proceed in this manner through all the parts of the integer, and the several denominations, standing on the left hand, make the answer.

EXAMPLES.

1. Find the value of ,691 of a pound.

,691
20

13,820
12

9,840
4

3,360 Ans. 13*s.* 9¾*d.*

2. What is the value of ,9 of a shilling? Ans. 10¾*d.*
3. What is the value of ,592 of a cwt.?
Ans. 2 qrs. 10 lbs. 4 oz. 13+drs.
4. What is the value of ,258 of a tun of wine?
Ans. 1 hhd. 2+gals.
5. What is the value of ,12785 of a year?
Ans. 46 days 15 hours 57 minutes 57+seconds.

## SINGLE RULE OF THREE DIRECT.

THE SINGLE RULE OF THREE DIRECT teaches, from three numbers given, to find a fourth, that shall be in the same proportion to the third, as the second is to the first.

If *more* require *more*, or *less* require *less*, the proportion is direct.

RULE. Write down the number which is of the same name or kind with the answer for the second term. Consider whether the answer ought to be greater or less than this number; then, if greater, write down the greater of the remaining numbers on the right of it, for the third term; but if less, make the less of those numbers the third term; and on the left of the second term, write down the remaining number for the first term.

Reduce the first and third numbers into the same, and the second into the lowest denomination mentioned in it.

2. Multiply the second and third numbers together, and

divide the product by the first, and the quotient (if there be no remainder) is the answer, or fourth number required.

NOTE. In multiplying the second and third numbers together, if either be 1, it is unnecessary to multiply by it: and the same remark applies to it, when used as a divisor.

If, after division, there be a remainder, reduce it to the next denomination below that to which the second number was reduced, and divide by the same divisor as before, and the quotient will be of this last denomination. Proceed thus with all the remainders till you have reduced them to the lowest denomination which the second number admits of, and the several quotients taken together will be the answer required.

The method of proof is by reversing the question.

EXAMPLES.

1. If 2 yards of cloth cost 4*s.* what will 125 yds. come to?

| *yds.* | *s.* | *yds.* |
|---|---|---|
| 2 | 4 | 125 |
| | | 4 |
| | | 2)500 |
| | | 20)250 |
| Ans. | £12 | 10 |

Proof.

| *yds.* | £ | *s.* | *yds.* |
|---|---|---|---|
| 125 | 12 | 10 | 2 |
| | 20 | | |
| | 250 | | |
| | 2 | | |
| | 125)500(4*s.* | | |
| | 500 | | |

2. When 891 gallons of oil cost £176 6 10½, how many gallons may be bought for 13*s.* 10½*d.*?

| £ | *s.* | *d.* | | *gal.* | | *s.* | *d.* |
|---|---|---|---|---|---|---|---|
| 176 | 6 | 10½ | : | 891 | : : | 13 | 10½ |
| 20 | | | | 665 | | 12 | |
| 3526 | | | | 4455 | | 166 | |
| 12 | | | | 5346 | | 4 | |
| 42322*d* | | | | 5346 | | 665 farthings. | |
| 4 | | | | 592515(3 gallons. | | | |
| 169290*f.* | | | | 507870 | | | |
| | | | | 84645 | | | |
| | | | | 4 | | | |
| | | | | 169290)338580(2 quarts. | | | |
| | | | | 338580 | | Ans. 3½ gallons. | |
| | | | | 6 | | | |

3. 871 yards : $78,39 : : 29 yards. Ans. $2,61.
4. $1\frac{3}{4}$ " : ,42 : : $87\frac{1}{2}$ " 21,00.
5. 79 $1\frac{1}{2}$ " : £8 5 $6\frac{1}{4}$ : : 5 " 1s. $0\frac{1}{4}$d.
6. $6\frac{1}{4}$d. : $1\frac{1}{4}$ yard : : £10 6 8 496 yards.
7. 1 lb. : $17\frac{3}{4}$ cts. : : 2 cwt. 1 qr. 21 lb. $48,45$\frac{1}{4}$.
8. £23 14 3 : 19 yards : : £142 5 6. 114 yards.
9. 6 lb. 8 oz. 4 dt. : £21 6 5 : : 40 lb. 1 oz. 4 dt, £127 18 6.
10. 7 cwt. 3 qrs. 15 lb. : £33 2 3 : : 1 qr. 21 lb. £1 16 9.
11. £21 4 $8\frac{1}{4}$ : $117\frac{1}{2}$ yards : : £141 13 $10\frac{1}{2}$. 687 yards.
12. $3\frac{3}{8}$ lb. : $3,51 cts. : : 3 qrs. 17 lb. 8 oz. $105,56.
13. £9 0 10 : 1 cwt. : : £89 5 $8\frac{3}{4}$. 9 cwt. 3 qrs. 14 lb.
14. $163,35 : 12 cwt. 3 qrs. 24 lbs. : : $3,15. 28 lbs.

15. B. owes £2119 17*s*. 6*d*. and he is worth but £1324 18*s*. $5\frac{1}{4}$*d*.; if he delivers this to his creditors, how much do they receive on the pound? Ans. 12*s*. 6*d*.

16. How many crowns of 110 cents each will pay a debt of £82 16*s*. $7\frac{1}{4}$*d*. N. E.? Ans. 251 crowns.

17. If 203 tons 9 cwt. 3 qrs. 3 lbs. of tallow cost £4558 3*s*. 0*d*. what does 1 ton cost? Ans. £22 8 0.

18. How many cwt. of rice may be bought for 487 dols. 50 cts. when 7 lb. cost 25 cents? Ans. 121 cwt. 3 qrs. 14 lb.

19. A captain of a ship is provided with 18000 lb. of bread for 150 seamen, of which each man eats 4 lb. per week, how long will it last them? Ans. 30 weeks.

20. How long would 2295 lb. of beef last for 45 seamen, if they get 1 lb. each, and that 3 times a week?

Ans. 17 weeks.

21. Suppose 120 seamen are provided with 7200 gallons of water for a cruise of 4 months, each month 30 days; how much is each man's share per day? Ans. 2 quarts.

22. A ship's company of 16 men is on allowance of 6 ounces of bread per day, when meeting with a vessel from which they are supplied with 2 cwt. of bread, what addition will this make to their daily allowance, if they suppose their voyage to last 28 days? Ans. 8 ounces.

23. A person failing in trade owes, viz. to A. $818,73; B. $3673,46; C. $1800,40; D. 117,41, and to E. 814,50; and his property, worth $4009,59$\frac{1}{4}$ cts. he gives up to his creditors; how much does he pay on the dollar, and what is E.'s loss on receiving his dividend?

Ans. He pays $55\frac{1}{4}$ per dollar—E.'s loss is $362,45$\frac{1}{4}$.

*ollowing Examples apply to the Percentage Calculations, iz. Interest, Commission, Discount, Insurance, &c.*

| | | | |
|---|---|---|---|
| $100 | $6 | $456,50 | Ans: $27,39 |
| " | 5 | 123,60 | 6,18 |
| " | 2½ | 268,40 | 6,71 |
| " | 17 | 190, | 32,30 |
| " | 25 | 94,80 | 23,70 |
| " | ⅝ | 760, | 4,75 |
| 100 lbs. | $2,50* | 648 lbs. | 16,20 |
| " | 3,25 | 2744 " | 89,18 |
| " | 3, | 579 " | 17,37 |
| £100 | £6 | £96 | Ans. £5 15 2¼ |
| " | 5 | 87 | 4 7 0 |
| " | 2½ | 75 | 1 17 6 |
| " | 17 | 286 | 48 12 4¾ |
| " | 25† | 392 18 4 | 98 4 7 |
| " | 33⅓† | 73 2 6 | 24 10 10 |
| " | ⅞ | 128 | 1 2 4¾ |
| " | 5⅝ | 95 11 9 | 5 7 6 |
| " | 1¾ | 144 | 2 10 4¾ |
| " | 17½ | 19 12 3 | 3 8 7½ |

A farm of 48 acres is owned, viz.—A. ⅓, B. ⅙, C. ⅛, ). the remainder. What is he to receive for his part, whole was sold for $918?

Ans. $357.

A. owns ⅓ of a farm of 108 acres, B. ⅙ of it, C. ⅛, and remainder. If D. sold his part for $714, what was m valued at?

Ans. $1836.

A. owes B. $87,52, for which B. agrees to take land ,60 per acre. How much land is B. to have?

Ans. 3 acres 1 r. 27 ps.

How much will 18 thousand 8 hundred and 36 casts es come to, at $12 per thousand?

. Staves are counted by casting 3 at a time; 40 casts make 1 hun- id 10 hundred 1 thousand.

* $2,50 per cent.=2½ cents per lb.

5 per cent. take ⅓ of the sum for the answer. At 33⅓ per cent. take ⅓ m for the answer.

| m. | | $ | | m. | h | cs. |
|---|---|---|---|---|---|---|
| 1 | : | 12 | : : | 18 | 8 | 36 |
| 10 | | | | 10 | | |
| 10 | | | | 188 | | |
| 40 | | | | 40 | | |
| 400 | | | | 7556 | | |
| | | | | 12 | | |
| | | | | 400)906,72 | | |
| | | | | 226,68 | | |

This work may be abridged by dividing the casts by 4, and annexing the quotient as a decimal to the hundreds, thus,

18 8 36

18,89

12

Ans. $226,68

Also—13 thousands, 3 hundreds 26 casts at $40.

13,365

40

534,600 Ans. $534,60.

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | 3 | 27 | - | 14,80 | - | 79,44 |
| 0 | 7 | 29 | - | 12,50 | - | 9,65½ |
| 8 | 3 | 23 | - | 14,00 | - | 117,00½ |
| 8 | 7 | 30 | - | 45,00 | - | 394,87½ |
| 3 | 6 | 18 | - | 50,00 | - | 182,25 |
| 1 | 1 | 25 | - | 18,00 | - | 20,92½ |

47. What will 56 bundles of hoops come to at $25 per M. of 30 bundles?

NOTE. Hoops are sometimes bound in bundles of 30 hoops each, and 4 such bundles are 1 hundred, and 10 hundred, or 40 bundles, 1 thousand. But they are generally bound in bundles of 40 each, 3 bundles making 1 hundred, and 10 hundred, or 30 bundles, 1 thousand.

48. 3)56

10 hund. : $25 : : 18⅔ hund. :
Or, 30 bund. : $25 : : 56 bund. : } $46,66⅔ cts.

49. If 98 lbs. net of sugar be equal to 1 cwt. gross, what gross weight is equal to 5 cwt. 2 qrs. net?

Ans. 6 cwt. 1 qr. 20 lbs.

50. What is the freight of 10,000 bricks from Waldoboro' to Boston, at $1,25 per 2000 lbs. allowing 6 bricks to weigh 26½ lbs.? Ans. $27,60.

51. What is the tax on lands, &c., valued at $2957 in the direct tax. at 28 cts. and 3 mills on the 100 dollars?

Ans. $8 36 cts. 8 ms.

52. What is the tax on 753 dollars, at $\frac{3}{10}$ per cent.?

753 dollars.
3 mills.

2259 mills. Ans. $2 25 cts. 9 ms.

53. Find the tax on the following sums: viz.

| | | |
|---|---|---|
| $1550 | at $\frac{4}{10}$ per cent. | Ans. $6 20. |
| 4560 | $\frac{5}{10}$ | 22 80. |
| 7850 | $\frac{6}{10}$ | 47 10. |
| 12680 | $\frac{7}{10}$ | 88 76. |

54. What will a piece of land, measuring 48 feet in length, and 40 in width at each end, amount to, at 20 dollars per square rod?

48 feet.
40

1920

*Feet.* $ *Feet.*
If 272¼ : 20 : : 1920

By decimals.

If 272,25 : 20 : : 1920 Ans. $141 4 cts.

55. A charter party for a vessel of 186 tons commenced on the 28th of May, and ended on the 10th of October following. What does the hire amount to for that time, at $2 per ton per month of 30 days?

| | *days.* |
|---|---|
| May | 4 |
| June | 30 |
| July | 31 |
| August | 31 |
| September | 30 |
| October | 10 |
| | 136 |

186
2 $

*Days.* — *days.*
If 30 : 372 : : 136 Ans. $1686,40.

56. If a man receive $15 for 1 year's interest of money, lent at 6 per cent. per annum, how much was the sum lent?

Ans. $250.

57. Bought 40 tubs of butter, weighing 36 cwt. 2 qrs. 14 lb. net, for $472,02; paid cooperage 12 cts. per tub; salt and labour 4 dols. 83 cts. 8ms.; storage 6 dols. 48 cts.—I would know what it stands me in per lb.?

Ans. 11 cts. 9 mills.

## INVERSE PROPORTION.

WHEREAS in the Rule of Three Direct, more requires more, and less requires less, in this rule more requires less, and less requires more.

RULE. After stating the terms as in the Rule of Three Direct, multiply the first and second terms together, and divide the product by the third, and the quotient is the answer.

EXAMPLES.

1. If 100 workmen complete a piece of work in 12 days, how many are sufficient to do it in 3 days?

*days. men. days.*
12 : 100 : : 3
12

3)1200

400 Ans. 400 men.

2. If 8 boarders drink a barrel of cider in 12 days, how long would it last if 4 more came among them?
Ans. 8 days.

3. When wheat is sold at 93 cents per bushel, the penny loaf weighs 12 ounces: what must it weigh when the wheat is $1,24 per bushel? Ans. 9 ounces.

4. How many yards of baize, 3 qrs. wide, will line a cloak which has in it 12 yards of camlet, half a yard wide?
Ans. 8 yards.

5. Suppose 400 men in a garrison are provided with provisions for 30 days, how many men must be sent out, if they would have the provisions last 50 days? Ans. 160 men.

6. What sum should be put to interest to gain as much in 1 month, as $127 would gain in 12 months? Ans. $1524.

7. If a head of 7 feet of water with 30 mill powers will reduce a pond of 200 acres, 8 inches in a day, how much will a head of 6 feet reduce it in the same time?

7 : 8 : : 6
7

6)56

Ans. 9⅓ inches.

8. If 30 mill powers would reduce a pond of 7 feet head $7\frac{1}{2}$ inches in a day, how much would they reduce a pond of 6 feet $6\frac{3}{4}$ inches head, in the same time?

7 ft. : $7\frac{1}{2}$ : : 6 $6\frac{3}{4}$

84 $78\frac{3}{4}$ inches.

4 4

336 : $7\frac{1}{2}$ : : 315

$7\frac{1}{2}$

2352

168

315)2520(8

2520

Ans. 8 inches.

9. A ship's company of 15 persons is supposed to have bread to last their voyage, allowing each 8 ounces per day—when they picked up a crew of 5 persons in distress, to whom they are willing to communicate, what will the daily allowance of each person then be? Ans. 6 ounces.

## COMPOUND PROPORTION

TEACHES to resolve such questions, as require two or more statings by Simple Proportion.

RULE. State the question, by placing the three conditional terms in this order: that which is the principal cause of gain, loss, or action, possesses the first place; that which denotes space of time or distance of place, the second; and that which is the gain, loss, or action, the third: then place the other two terms, which move the question, under those of the same name; and if the blank place fall under the third, multiply the three last terms for a dividend, and the two first for a divisor; but if the blank fall under the first or second place, multiply the first, second and last terms together for a dividend, and the other two for a divisor; and the quotient will be the answer.

EXAMPLES.

1. If £100 in 12 months gain £5, how much will £400 gain in 3 months?

| £ | mo. | £ |
|---|---|---|
| 100 | : 12 | : 5 |
| 400 | : 3 | |
| 3 | | |

100 × 12 × 3 = 3600; 1200 × 5 = 6000

12|00 )60|00

£5 Ans. £5.

2. What is the interest of $654 for 164 days, at 6 per cent. per annum, taking the year at 360 days?

100 × 360 = 36000 the fixed divisor.

654 dollars. × 164 = 107,256

6,000)107,256

Ans. $17,87,6 mills.

3. If 8 men make 24 rods of wall in 6 days, how many men will build 18 rods in 3 days?

| men. | days. | rods. |
|---|---|---|
| 8 | : 6 | : : 24 |
| | 3 | 18 |
| | | 6 |

24 × 3 × 6 = 432; 108 × 8 = 864

72 )864(12

72

144

144 Ans. 12 men.

The answers may be found by two distinct operations, thus:

4. If a basin of 190 acres would rise 10 inches in 12 hours,

how high would a basin of 50 acres rise in 10 hours, with the same head of water?

*acres.* *inches.* *acres.*
190 : 10 : : 50
10

50)1900

38 inches.

12 : 38 : : 10 hours.
10

12)380

Ans. $31\frac{2}{3}$ inches.

5. In what time would it rise to 38 inches?

*inches.* *hours.* *inches.*
$31\frac{2}{3}$ : 10 : : 38
3 3

95 : 10 : : 114
10

95)1140

Ans. 12 hours.

6. Suppose a wall 40 feet high and 2 feet thick, has a sufficient foundation of 3 feet in width, what should be the breadth of the foundation of a wall, 50 feet high and $2\frac{1}{2}$ feet thick, upon a like bed of earth? Ans. 4 ft. $8\frac{1}{4}$ inches.

7. If a family of 9 persons spend $450 in 5 months, how much would be sufficient to maintain them 8 months, if 5 more were added to the family? Ans. $1120.

8. If 1 pound of yarn make 3 yards of cloth, 5 quarters wide, how many pounds of yarn would be wanted to make a piece of cloth 45 yds. long, and 1 yd. wide? Ans. 12 lbs.

9. A person engaged to remove 800 tons of timber from Exeter to the Navy Yard in Portsmouth: if in 6 days he has removed 450 tons with 36 oxen, how many oxen would be wanted to remove the remainder in 3 days?

Ans. 56 oxen.

# VULGAR FRACTIONS.

FRACTIONS, or broken numbers, are expressions for any assignable parts of an unit; and are represented by two numbers, placed one above the other, with a line drawn between them.

The number above the line is called the *numerator*, and that below the line the *denominator*.

The denominator shows how many parts the integer is divided into, and the numerator shows how many of those parts are meant by the fraction.

Fractions are either proper, improper, compound or mixed.

1st. A *proper fraction* is when the numerator is less than the denominator, as $\frac{1}{3}$, $\frac{3}{8}$, $\frac{9}{11}$, $\frac{43}{96}$, &c.

2d. An *improper fraction* is when the numerator is either equal to or greater than the denominator, as $\frac{8}{8}$, $\frac{11}{6}$, $\frac{12}{12}$, $\frac{35}{20}$, &c.

3d. A *compound fraction* is a fraction of fractions, and known by the word *of*, as $\frac{1}{2}$ of $\frac{2}{3}$, $\frac{7}{8}$ of $\frac{9}{15}$, $\frac{1}{16}$ of $\frac{2}{2}\frac{1}{3}$, &c.

4th. A *mixed number* or *fraction* is composed of a whole number and a fraction, as $8\frac{3}{4}$, $17\frac{1}{2}$, $29\frac{3}{4}$, &c.

## I. *To reduce a simple fraction to its lowest terms.*

RULE. Find a common measure by dividing the lower term by the upper, and that divisor by the remainder, continuing till nothing remains; the last divisor is the common measure; then divide both parts of the fraction by the common measure, the quotients express the fraction required.

NOTE. If the common measure happens to be 1, the fraction is already in its lowest term; and when a fraction has ciphers at the right hand, it may be abbreviated by cutting them off, as $\frac{4}{5}|\frac{0}{0}$.

EXAMPLES.

1. Reduce $\frac{91}{117}$ to its lowest terms.

91)117(1
91

26)91(3
78

Common measure 13)26(2
26

13)$\frac{91}{117}$($\frac{7}{9}$ the answer.

Or, divide the terms of the fractions by any number that will divide them without a remainder; divide the quotients in the same manner, and so on, till no number will divide them both, and the last quotients express the fraction in its lowest terms.

2. Reduce $\frac{192}{576}$ to its lowest terms.

$$\begin{array}{cccc} (8) & (8) & (3) & \\ 192 & 24 & 3 & 1 \\ \hline 576 & 72 & 9 & 3 \end{array}$$ the answer.

3. Reduce $\frac{144}{216}$ to its lowest terms. Ans. $\frac{2}{3}$.

II. *To reduce a mixed number to an improper fraction.*

RULE. Multiply the whole numbers by the denominator of the fraction, and to the product add the numerator for a new numerator, and place it over the denominator.

NOTE. To express a whole number fraction-wise, set one for a denominator to the given number.

EXAMPLES.

1. Reduce $5\frac{3}{8}$ to an improper fraction.

$5\times 8+3=\frac{43}{8}$ the answer.

2. Reduce $183\frac{5}{21}$ to an improper fraction. Ans. $\frac{3848}{21}$.

III. *To reduce an improper fraction to its proper terms.*

RULE. Divide the upper term by the lower, and the quotient will be the whole number; the remainder, if any, will be the numerator to the fractional part.

EXAMPLES.

1. Reduce $\frac{17}{5}$ to its proper terms.

$$\begin{array}{r} 5)17(3\frac{2}{5} \text{ the answer.} \\ 15 \\ \hline 2 \end{array}$$

2. Reduce $\frac{245}{8}$ to its proper terms. Ans. $27\frac{5}{8}$.

IV. *To find the least common multiple or denominator.*

RULE. Divide the given denominators by any number that will divide two or more of them without a remainder, and set the quotients and the undivided numbers underneath. Divide these quotients and undivided numbers by any number that will divide two or more of them as before, and thus continue, till no two numbers are left capable of being lessened.

Multiply the last quotients and the divisor or divisors together, and the product will be the least common denominator required.

EXAMPLES.

1. What is the least common measure of $\frac{5}{8}$, $\frac{7}{8}$, $\frac{6}{15}$, and $\frac{8}{16}$?

8)9 8 15 16

3)9 1 15 2

3 1 5 2

$3\times5\times2=30\times3\times8=720$ Ans.

2. What is the least number that can be divided by the nine digits without a remainder? Ans. 2520.

V. *To reduce vulgar fractions to a common denominator.*

RULE. Find a common denominator by the last case, in which divide each particular denominator, and multiply the quotient by its own numerator, for a new numerator, and the new numerators, being placed over the common denominator, express the fractions required in their lowest terms.

EXAMPLES.

1. Reduce $\frac{3}{4}$, $\frac{5}{9}$, and $\frac{7}{12}$ to a common denominator.

36 the com. denom.

| | |
|---|---|
| 4 | $9\times3=27$ |
| 9 | $4\times5=20$ |
| 12 | $3\times7=21$ |

The fractions will be $\frac{27}{36}$, $\frac{20}{36}$, $\frac{21}{36}$.

2. Reduce $\frac{1}{2}$, $\frac{2}{3}$, $\frac{5}{8}$, and $\frac{7}{8}$, to a common denominator.

Ans. $\frac{12}{24}$, $\frac{16}{24}$, $\frac{20}{24}$, $\frac{21}{24}$.

VI. *To reduce a compound fraction to a single one.*

RULE. Multiply all the numerators for a new numerator, and all the denominators for a new denominator, then reduce the new fraction to its lowest terms by Case I.

EXAMPLES.

1. Reduce $\frac{3}{4}$ of $\frac{5}{6}$ of $\frac{9}{10}$ to a single fraction.

$3\times5\times9=135$ 9

$4\times6\times10=240$ 16 the answer.

2. Reduce $\frac{5}{6}$ of $\frac{4}{7}$ of $\frac{11}{12}$ to a single fraction. Ans. $\frac{44}{126}$.

3. Reduce $\frac{2}{7}$ of $\frac{5}{8}$ of $\frac{4}{5}$ to a single fraction. Ans. $\frac{8}{56}$.

VII. *To reduce a fraction of one denomination to the fraction of another, but greater, retaining the same value.*

RULE. Reduce the given fraction to a compound one, by multiplying it with all the denominations between it and that denomination, to which you would reduce it; then reduce that compound fraction to a single one.

EXAMPLES.

1. Reduce $\frac{7}{8}$ of a penny to the fraction of a pound.

$$\frac{7}{8} \text{ of } \frac{1}{12} \text{ of } \frac{1}{20} = \frac{7 \times 1 \times 1}{8 \times 12 \times 20} = \frac{7}{1920} \text{ the answer.}$$

2. Reduce $\frac{4}{5}$ of a pennyweight to the fraction of a pound Troy. Ans. $\frac{1}{300}$.

VIII. *To reduce a fraction of one denomination to the fraction of another, but less, retaining the same value.*

RULE. Multiply the numerator by the parts contained in the several denominations between it and that denomination to which you would reduce it for a new numerator, and place it over the denominator of the given fraction.

EXAMPLES.

1. Reduce $\frac{1}{960}$ of a pound to the fraction of a penny.

$$\frac{1 \times 20 \times 12}{960} = \frac{240}{960} = \frac{1}{4} \text{ the answer.}$$

2. Reduce $\frac{1}{300}$ of a lb. Troy to the fraction of a dwt. Ans. $\frac{4}{5}$.

IX. *To find the value of the fraction in the known parts of the integer.*

RULE. Multiply the numerator by the known parts of the integer, and divide by the denominator.

EXAMPLES.

1. What is the value of $\frac{2}{3}$ of a £?

2
20 shillings.

3)40

Ans. 13*s.* 4*d.*

2. What is the value of $\frac{2}{5}$ of a shilling? Ans. 4*d.* $3\frac{1}{5}$ *qrs.*

3. Reduce $\frac{3}{5}$ of a lb. Troy to its proper quantity.

Ans. 7 oz. 4 dwt.

X. *To reduce any given quantity to the fraction of a greater denomination of the same kind.*

RULE. Reduce the given quantity to the lowest denomination mentioned for a new numerator, under which set the integral part (reduced to the same name) for a denominator, and it will express the fraction required.

EXAMPLES.

1. Reduce 16*s.* 8*d.* to the fraction of a pound.

$$\begin{array}{r} 16\ \ 8 \\ 12 \\ \hline 200\ \ 5 \\ \hline 240\ \ 6 \end{array} = \text{the answer.}$$

2. Reduce 2 quarters $3\frac{1}{3}$ nails to the fraction of an ell English. Ans. $\frac{5}{6}$.

## ADDITION OF VULGAR FRACTIONS.

I. *To add fractions that have a common denominator.*

RULE. Add their numerators together, and place the sum over one of the given denominators.

EXAMPLES.

1. Add $\frac{1}{9}$, $\frac{2}{9}$, $\frac{4}{9}$, $\frac{5}{9}$, and $\frac{7}{9}$ together.

$$\begin{array}{r} 1 \\ 2 \\ 4 \\ 5 \\ 7 \\ \hline 19 \\ \hline 9 \end{array} = 2\tfrac{1}{9} \text{ the answer.}$$

2. Add $\frac{7}{24}$, $\frac{11}{24}$, and $\frac{13}{24}$ together. Ans. $1\frac{7}{24}$.
3. Add $\frac{13}{20}$, $\frac{17}{20}$, and $\frac{9}{20}$ together. Ans. $1\frac{19}{20}$.

II. *To add mixed numbers, whose fractions have a common denominator.*

RULE. Add the fractions by the last Case, and the integers as in whole numbers.

EXAMPLES.

1. Add $2\frac{1}{11}$, $3\frac{2}{11}$, $4\frac{4}{11}$, and $7\frac{9}{11}$ together.

$2\frac{1}{11}$
$3\frac{2}{11}$
$4\frac{4}{11}$
$7\frac{9}{11}$

$17\frac{5}{11}$ answer.

2. Add $13\frac{1}{15}$, $9\frac{4}{15}$, and $3\frac{7}{15}$ together. Ans. $25\frac{4}{5}$.
3. Add $1\frac{1}{12}$, $2\frac{5}{12}$, $3\frac{7}{12}$, and $4\frac{11}{12}$ together. Ans. 12.

III. *To add fractions, having different denominators.*

RULE. Find the least common denominator by Case IV. in Reduction, in which divide each denominator, and multiply the quotient by its numerator; the sum of the products is a new numerator to the common denominator, and the fraction required.

EXAMPLES.

1. Add $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$, and $\frac{11}{12}$ together.

24 com. denominator.

| | | |
|---|---|---|
| 3 | 8× | 2=16 |
| 4 | 6× | 3=18 |
| 6 | 4× | 5=20 |
| 8 | 3× | 7=21 |
| 12 | 2× | 11=22 |

$\frac{97}{24}=4\frac{1}{24}$ the answer.

2. Add $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{7}$, and $\frac{1}{8}$ together. Ans. $1\frac{61}{280}$.
3. Add $\frac{4}{5}$, $\frac{5}{6}$, $\frac{6}{7}$, $\frac{3}{8}$, and $\frac{8}{15}$ together. Ans. $3\frac{67}{168}$.

IV. *To add mixt numbers, whose fractions have different denominators.*

RULE. Add the fractions as in the last case, and the integers as in whole numbers.

EXAMPLES.

1. Add $5\frac{2}{3}$, $6\frac{7}{8}$, and $4\frac{1}{2}$ together.

24 com. denominator.

| | |
|---|---|
| $5\frac{2}{3}$ | 16 |
| $6\frac{7}{8}$ | 21 |
| $4\frac{1}{2}$ | 12 |
| Ans. $17\frac{1}{24}$ | $\frac{49}{24}=2\frac{1}{24}$ |

2. Add $1\frac{3}{5}$, $\frac{4}{5}$ of $\frac{1}{3}$, and $9\frac{3}{25}$ together. Ans. $11\frac{1}{60}$.
3. Add $1\frac{9}{10}$, $6\frac{7}{8}$, $\frac{2}{3}$ of $\frac{1}{2}$, and $7\frac{1}{2}$ together. Ans. $16\frac{73}{120}$.

V. *When the fractions are of several denominations.*

RULE. Reduce them to their proper quantities by Case IX. in Reduction, and add as before.

EXAMPLES.

1. Add $\frac{7}{8}$ of a £ to $\frac{3}{10}$ of a shilling.

| | s. | d. | 15 common measure. |
|---|---|---|---|
| $\frac{7}{8}$ of a £ = | 15 | $6\frac{3}{5}$ | 10 |
| $\frac{3}{10}$ of a s. = | 0 | $3\frac{3}{5}$ | 9 |
| Ans. | 15 | $10\frac{4}{15}$ | $\frac{19}{15} = 1\frac{4}{15}$. |

2. Add $\frac{2}{3}$ of a yard, $\frac{3}{4}$ of a foot, and $\frac{7}{8}$ of a mile together.
Ans. 1540 yds. 2 ft. 9 in.
3. Add $\frac{1}{3}$ of a week, $\frac{1}{4}$ of a day, and $\frac{1}{2}$ of an hour together.
Ans. 2 days, $14\frac{1}{2}$ hours.

## *SUBTRACTION OF VULGAR FRACTIONS.*

I. *To find the difference between simple fractions that have a common denominator.*

RULE. Subtract the less numerator from the greater, and under the remainder put the denominator.

EXAMPLES.

| | | | | |
|---|---|---|---|---|
| From | $\frac{5}{7}$ | $\frac{11}{12}$ | $\frac{15}{16}$ | $\frac{17}{35}$ | $\frac{105}{209}$ |
| Take | $\frac{2}{7}$ | $\frac{5}{12}$ | $\frac{3}{16}$ | $\frac{13}{35}$ | $\frac{80}{209}$ |
| Rem. | $\frac{3}{7}$ | $\frac{1}{2}$ | $\frac{3}{4}$ | $\frac{4}{35}$ | $\frac{6}{209}$. |

II. *To subtract a fraction or mixt number from a whole number.*

RULE. Subtract the numerator from the denominator, and under the remainder put the denominator, and carry one to be deducted from the integer.

EXAMPLES.

| | | | | | |
|---|---|---|---|---|---|
| From | 3 | 6 | 10 | 9 | 100 |
| Take | $0\frac{3}{16}$ | $0\frac{7}{8}$ | $0\frac{1}{10}$ | $5\frac{1}{2}$ | $99\frac{88}{100}$. |
| Rem. | $2\frac{13}{16}$ | $5\frac{1}{8}$ | $9\frac{9}{10}$ | $3\frac{1}{2}$ | $0\frac{1}{100}$. |

*To subtract simple fractions that have no common denominator.*

ULE. By Case IV. in Reduction, find the common de-inator, in which divide each denominator, and multiply quotient by its numerator; the difference between the ucts thus found is a numerator to the common denomi-r, and the answer required.

EXAMPLES.

rom $\frac{17}{21}$ take $\frac{9}{14}$.

42 com. denom.

21 $2\times17=34$
14 $3\times 9=27$

Rem. $\frac{7}{42}=\frac{1}{6}$, the answer.

| | | | | | |
|---|---|---|---|---|---|
| From | $\frac{5}{8}$ | $\frac{11}{12}$ | $\frac{5}{6}$ | $\frac{8}{15}$ | $\frac{208}{210}$ |
| Take | $\frac{1}{2}$ | $\frac{2}{4}$ | $\frac{4}{5}$ | $\frac{9}{20}$ | $\frac{7}{144}$ |
| Rem. | $\frac{1}{8}$ | $\frac{1}{6}$ | $\frac{1}{30}$ | $\frac{1}{12}$ | $\frac{287}{432}$ |

n order to distinguish the greater of two fractions, let n be reduced to a common denominator, as in Case V. eduction; and that fraction, whose numerator is greater, he greater fraction; the difference between the new nu-ators, being set over the common denominator, will show excess or inequality.

EXAMPLE.

Which of the two is the greater fraction, $\frac{11}{12}$, or $\frac{15}{16}$?

48 com. denom.

12 $4\times11=44$
16 $3\times15=45$

Ans. $\frac{15}{16}$ is greater by $\frac{1}{48}$.

*To subtract a fraction or mixt number from a mixt number, when the fractional part to be subtracted is greater than that from which it is to be subtracted.*

ULE. Find a common denominator and a new numerator, in the last case, and then subtract the numerator of the ater fraction from the common denominator, and to the

remainder add the less numerator, and set the sum of both for a new numerator over the common denominator, and carry one to the integral part, and proceed as in whole numbers.

EXAMPLES.

| | | | |
|---|---|---|---|
| | 27 common denominator. | | |
| From | $13\frac{1}{3}$ | $3\times 1=3$ | |
| Take | $8\frac{14}{27}$ | $1\times 14=14$ | |
| | $4\frac{16}{27}$ | $\frac{16}{27}$ | |
| From | $6\frac{5}{7}$ | $10\frac{3}{10}$ | $12\frac{5}{12}$ | $19\frac{5}{11}$ |
| Take | $0\frac{6}{7}$ | $1\frac{7}{12}$ | $6\frac{1}{2}$ | $0\frac{7}{15}$ |
| Rem. | $5\frac{6}{7}$ | $8\frac{23}{60}$ | $5\frac{11}{12}$ | $18\frac{183}{165}$ |

V. *When the fractions are of different denominations.*

RULE. Reduce them to their proper quantities, and subtract as before.

EXAMPLES.

1. From $\frac{7}{8}$ of a £ take $\frac{2}{10}$ of a shilling.

| | *s.* | *d.* | 15 com. denominator. |
|---|---|---|---|
| $\frac{7}{8}$ of a £ = | 15 | $6\frac{2}{3}$ | 10 |
| $\frac{2}{10}$ of a *s.* = | 0 | $3\frac{3}{5}$ | 9 |
| Rem. | 15 | $3\frac{1}{15}$ | |

2. From $\frac{3}{4}$ of a £ take $\frac{3}{4}$ of a shilling. Ans. 14*s.* 3*d.*
3. From $\frac{3}{4}$ of a lb. Troy take $\frac{1}{8}$ of an ounce. Ans. 8 oz. 16 dwt. 16 grs.
4. From 7 weeks take $9\frac{7}{10}$ days. Ans. 5w. 4d. 7h. 12m.
5. From $\frac{1}{6}$ of a yard take $\frac{2}{3}$ of an inch. Ans. 5 inch. 1 bc.

## *MULTIPLICATION OF VULGAR FRACTIONS.*

RULE. Reduce compound fractions to simple ones, and mixt numbers to improper fractions; then multiply the numerators together for a new numerator, and the denominators for a new denominator.

EXAMPLES.

1. Multiply $4\frac{1}{2}$ by $\frac{1}{8}$.

$$4\tfrac{1}{2} = \frac{9\times1}{2\times8} = \tfrac{9}{16}$$ the answer.

2. Multiply $\frac{3}{8}$ by $\frac{4}{5}$. Ans. $\frac{3}{10}$.
3. Multiply $\frac{7}{9}$ by $\frac{2}{3}$. Ans. $\frac{14}{27}$.
4. Multiply $48\frac{3}{5}$ by $13\frac{5}{6}$. Ans. $672\frac{3}{10}$.

## *DIVISION OF VULGAR FRACTIONS.*

RULE. Prepare the fractions, if necessary; then invert the divisor, and proceed as in Multiplication.

EXAMPLES.

1. Divide $\frac{4}{7}$ by $\frac{2}{3}$.

$$\frac{4\times3}{7\times2} = 1\tfrac{2}{14} = \tfrac{6}{7}$$ the answer.

2. Divide $3\frac{1}{6}$ by $9\frac{1}{2}$.

$3\frac{1}{6}$ $9\frac{1}{2}$
6 2

$\frac{19}{6}$ $\frac{19}{2}$ Then $\frac{19\times2}{6\times19} = \frac{38}{114} = \frac{1}{3}$ the answer.

3. Divide 5 by $\frac{7}{10}$. Ans. $7\frac{1}{7}$.
4. Divide $\frac{9}{10}$ by $4\frac{1}{2}$. Ans. $\frac{1}{5}$.

## *MISCELLANEOUS QUESTIONS*

IN THE PRECEDING RULES.

1. What part is $28\frac{11}{12}$ of $33\frac{1}{21}$? Ans. $\frac{7}{8}$.
2. What will remain if $13\frac{5}{8}s.$ and $7\frac{5}{8}d.$ be taken from £1? Ans. $5s.\ 6\frac{3}{8}d.$
3. Which is the greater fraction $\frac{8}{15}$ or $\frac{9}{20}$?
Ans. $\frac{8}{15}$ is greater by $\frac{1}{12}$.
4. Of what number is 176 the $\frac{11}{33}$ part? Ans. 368.
5. By how much must you multiply $13\frac{2}{3}$ that the product may be $49\frac{1}{5}$? Ans. $3\frac{3}{5}$.
6. A farmer being asked, how many sheep he had, answered, that he had them in 5 fields; in the first he had $\frac{1}{4}$ of his flock, in the second $\frac{1}{6}$, in the third $\frac{1}{8}$, in the fourth $\frac{1}{12}$, and in the fifth 450; how many had he? Ans. 1200.

## *RULE OF THREE DIRECT IN VULGAR FRACTIONS.*

RULE. Having stated the question, make the necessary preparations as in Reduction of Fractions, and invert the first term; then proceed as in Multiplication of Fractions.

EXAMPLES.

1. If $\frac{1}{4}$ of a yard of cloth cost $\frac{2}{3}$ of a shilling, what will $\frac{7}{8}$ of a yard come to?

$$\text{If } \frac{1}{4}\,yd. : \frac{2}{3}\,s. :: \frac{7}{8}\,yd.$$

*inverted*

$$\frac{4\times2\times7}{1\times3\times8}\,s. = \frac{56}{24} = 2s.\ 4d.\ \text{the answer.}$$

2. If $\frac{3}{16}$ of a ship cost £273 2*s.* 6*d.* what are $\frac{5}{32}$ of her worth? Ans. £227 12*s.* 1*d.*

3. If $\frac{1}{4}$ of a yard cost $\frac{2}{3}$ of a pound, what will $\frac{3}{5}$ of an ell English come to, at the same rate? Ans. £2.

4. A person having $\frac{2}{5}$ of a coal mine, sells $\frac{3}{4}$ of his share for £171; what is the whole mine valued at? Ans. £380.

## *SINGLE RULE OF THREE INVERSE IN VULGAR FRACTIONS.*

EXAMPLES.

1. If 25$\frac{1}{7}$*s.* will pay for the carriage of 1 cwt. 145$\frac{1}{2}$ miles, how far may 6$\frac{1}{2}$ cwt. be carried for the same money?

Ans. 22$\frac{9}{26}$ miles.

2. If 3$\frac{1}{4}$ yards of cloth that is 1$\frac{1}{5}$ yard wide, be sufficient to make a cloak, how much must I have of that sort, which is $\frac{4}{5}$ yard wide, to make another of the same bigness?

Ans. 4$\frac{7}{8}$ yards.

3. If 3 men can do a piece of work in 4$\frac{1}{2}$ hours, in how many hours will 10 men do the same work? Ans. 1$\frac{7}{20}$.

4. If the penny white-loaf weigh 7 oz. when a bushel of wheat cost 5*s.* 6*d.* what is the bushel worth when the penny white-loaf weighs but 2$\frac{1}{2}$ oz.? Ans. 15*s.* 4$\frac{4}{5}$*d.*

## QUESTIONS FOR EXERCISE IN FRACTIONS.

1. How much is $\frac{5}{9}$ and $\frac{15}{16}$?
2. How much is $\frac{5}{9}$ of $\frac{15}{16}$?
3. Take $\frac{5}{9}$ from $\frac{15}{16}$.
4. Multiply $\frac{5}{9}$ by $\frac{15}{16}$.
5. Divide $\frac{5}{9}$ by $\frac{15}{16}$.
6. Divide $\frac{15}{16}$ by $\frac{5}{9}$.
7. Divide $\frac{1}{2}$ by $\frac{1}{4}$.
8. Divide $\frac{1}{4}$ by $\frac{1}{2}$.
9. Divide $\frac{1}{4}$ by 1.
10. Divide 1 by $\frac{1}{4}$.
11. How much is $\frac{1}{5}$ and $4\frac{2}{3}$?
12. How much is $\frac{1}{5}$ of $4\frac{2}{3}$?
13. Take $\frac{1}{5}$ from $4\frac{2}{3}$.
14. Multiply $4\frac{2}{3}$ by $\frac{1}{5}$.
15. Divide $4\frac{2}{3}$ by $\frac{1}{5}$.
16. Divide $\frac{1}{5}$ by $4\frac{2}{3}$.
17. Add $\frac{1}{5}$, $\frac{1}{9}$, $\frac{2}{3}$ of $7\frac{1}{4}$, and $\frac{3}{4}$ together.
18. Multiply $\frac{1}{3}$ of $5\frac{1}{4}$ by $\frac{7}{8}$.
19. Divide $\frac{3}{8}$ of $9\frac{1}{4}$ by $\frac{2}{3}$ of $1\frac{1}{4}$.
20. Reduce $\frac{1}{4}d.$ $\frac{11}{80}$ to the fraction of a penny.

### DECIMALS.

21. Add nine tenths, ninety thousandths, four, and four hundredths, one hundred, and one thousandth together.
22. Take two hundred and seventeen thousandths from two thousand, and seventeen thousandths.
23. Multiply fifty-six, and 875 thousandths by one, and eight thousandths.
24. Divide fourteen, and one thousandth by fifty-four ten thousandths.

---

## PRACTICE

Is a contraction of the Rule of Three Direct, when the first term happens to be an unit, or one, and has its name from its frequent use in business.

## THE TABLE.

| Parts of a £. | | | | Parts of a Ton. | | | | Parts of a ½ Cwt. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| s. | d. | | | Cwt. | qr. | | | lbs. | | |
| 10 | | is | ½ | 10 | | is | ½ | 28 | is | ½ |
| 6 | 8 | - | ⅓ | 5 | | - | ¼ | 14 | - | ⅛ |
| 5 | | - | ¼ | 4 | | - | ⅕ | 8 | - | 1/7 |
| 4 | | - | ⅕ | 2 | 2 | - | ⅛ | 7 | - | ⅛ |
| 3 | 4 | - | ⅙ | 2 | | - | 1/10 | 4 | - | 1/14 |
| 2 | 6 | - | ⅛ | 1 | | - | 1/20 | 3½ | - | 1/16 |
| 2 | | - | 1/10 | | | | | 2 | - | 1/28 |
| 1 | 8 | - | 1/12 | Parts of a Cwt. | | | | | | |
| 1 | | - | 1/20 | qrs. | lbs. | | | Parts of a ¼ Cwt. | | |
| Parts of a Shilling. | | | | 2 | | is | ½ | lbs. | | |
| d. | | | | 1 | | - | ¼ | 14 | is | ½ |
| 6 | | is | ½ | | 16 | - | 1/7 | 7 | - | ¼ |
| 4 | | - | ⅓ | | 14 | - | ⅛ | 4 | - | 1/7 |
| 3 | | - | ¼ | | 8 | - | 1/14 | 3½ | - | ⅛ |
| 2 | | - | ⅙ | | 7 | - | 1/16 | 2 | - | 1/14 |
| 1½ | | - | ⅛ | | 4 | - | 1/28 | 1 | - | 1/28 |
| 1 | | - | 1/12 | | 2 | - | 1/56 | | | |

### Case I.

*When the price is an aliquot, or even part of a shilling.*

Rule. Divide the given number by the part, and the quotient is the answer in shillings; what remains is to be reduced as in Compound Division.

Examples.

1. What will 4596 yards cost at 6*d.* per yard?

6*d.* ½ | 4596

2|0 | 229|8

114 18 Ans. £114 18*s.*

2. 3746 yards at 4*d.* per yard. Ans. £62 8*s.* 8*d.*
3. 1095 " 3*d.* " " . £13 13*s.* 9*d.*

### Case II.

*When the price is pence, or pence and farthings, and no even part of a shilling.*

Rule. Find the even parts for the price, and proceed as in Case I. and the sum of the quotients is the answer.

EXAMPLES.

1. What will 4937 yards come to at 9*d.* per yard?

| | | |
|---|---|---|
| 6 | ½ | 4937 |
| 3 | ½ | 2468 6 |
| | | 1234 3 |
| 2\|0 | | 370\|2 9 |

Ans. £185 2 9

| *Yards.* | *d.* | | £. | *s.* | *d* |
|---|---|---|---|---|---|
| 2. 2765 at | 8 | per yard. | Ans. 92 | 3 | 4 |
| 3. 3762 " | 7 | - - - - - - - - - - | 109 | 14 | 6 |
| 4. 3159 " | 7½ | - - - - - - - - - - | 98 | 14 | 4½ |

CASE III.

*When the price is shillings, or shillings and pence, and an even part of a pound.*

RULE. Divide the given quantity by the even part, and the quotient is the answer in pounds. If there be a remainder, reduce it as in Compound Division.

EXAMPLES.

1. At 6*s.* 8*d.* per yard, what will 473 yards come to?

6*s.* 8*d* | ⅓ | 473

Ans. £157 13*s.* 4*d.*

| *Yards.* | *s.* | *d.* | | £ | *s.* | *d.* |
|---|---|---|---|---|---|---|
| 2. 387 at | 10 | | Ans. | 193 | 10 | 0 |
| 3. 478 " | 5 | - - - - - - - - - | | 119 | 10 | 0 |
| 4. 397 " | 3 | 4 - - - - - - - - - | | 66 | 3 | 4 |

CASE IV.

*When the price is shillings, or shillings and pence, which make no even part of a pound.*

RULE. Find the even parts for the price, and divide as in Case III. or multiply the given quantity by the shillings, and take the even parts of shillings for the pence, as in Case II.

### Examples.

1. What cost 287 yards at 17*s.* 6*d.* per yard?

First method.

| *s.* | *d.* | | 287 |
|---|---|---|---|
| 10 | | 1/2 | 143 10 |
| 5 | | 1/4 | 71 15 |
| 2 | 6 | 1/2 | 35 17 6 |

Ans £251 2*s.* 6*d.*

Second method.

287
17 6

2009
287
6 | 1/2 | 143 6

2|0)502|2 6

Ans. £251 2*s.* 6*d.*

| | *Yards.* | | *s.* | *d.* | | £ | *s.* | *d.* |
|---|---|---|---|---|---|---|---|---|
| 2. | 8172 | at | 15 | | Ans. | 6129 | | |
| 3. | 3691 | " | 19 | | | 3506 | 9 | |
| 4. | 4765 | " | 11 | 8 | | 2779 | 11 | 8 |
| 5. | 3718 | " | 18 | 4 | | 3408 | 3 | 4 |
| 6. | 709¼ | " | 12 | 6 | | 443 | 5 | 7½ |
| 7. | 213 | " | 14 | 10 | | 157 | 19 | 6 |

### Case V.

*When the price is an even number of shillings.*

Rule. Multiply the quantity by half the shillings, doubling the first (or right hand) figure of the product for shillings, the rest are pounds.

### Examples.

1. What will 788 yards come to, at 2 shillings per yard?

788
1=half the shillings.

Ans. £78 16

| | *Yards.* | | *s.* | | £ | *s.* |
|---|---|---|---|---|---|---|
| 2. | 347 | at | 4 | Ans. | 69 | 8 |
| 3. | 638 | " | 6 | | 191 | 8 |
| 4. | 589¼ | " | 8 | | 235 | 14 |
| 5. | 246 | " | 10 | | 123 | 0 |
| 6. | 324¾ | " | 12 | | 194 | 17 |
| 7. | 523 | " | 14 | | 366 | 2 |

*When the quantity and price are both of several denominations.*

Rule. Multiply the price by the number in the highest

denomination, and take parts of the price for the rest, and these added together will give the answer.

EXAMPLES.

1. What will 6 cwt. 3 qrs. 14 lbs. of sugar come to, at £3 15 6 per cwt.?

| | | | | |
|---|---|---|---|---|
| | 3 | 15 | 6 | |
| | | | 6 | |
| | 22 | 13 | 0 | price of 6 cwt. |
| 2 qrs. ½ | 1 | 17 | 9 | " 2 qrs. |
| 1 " ¼ | 0 | 18 | 10½ | " 1 " |
| 14 lbs. ½ | 0 | 9 | 5¼ | " 14 lbs. |
| Ans. £ | 25 | 19 | 0¾ | |

2. What will 6 cwt. 2 qrs. 23 lbs. of lead come to, at $12 per cwt.

| | | | Or | |
|---|---|---|---|---|
| | 12,00 | | | 751 lbs. |
| | 6 | | | 12 |
| | 72,00 | | | 4)9012 |
| 2 qrs. ½ | 6,00 | | | |
| 14 lbs. ¼ | 1,50 | | | 7)2253 |
| 7 " ½ | ,75 | | | |
| 2 " ⅐ | ,21,4 | | | 4)321,857 |
| Ans. | $80,46,4 | | | $80,46,4 |

3. How much will 16 cwt. 1 qr. 25 lbs. of potashes come to, at $82,50 per ton, or 2240 lbs.?

| | | | |
|---|---|---|---|
| | 82,50 | | Or 1845 lbs. |
| | | | 82½ |
| 10 cwt. ½ | 41,25 | | |
| 5 " ¼ | 20,62,5 | | 3690 |
| 1 " ⅕ | 4,12,5 | | 14760 |
| 1 qr. ¼ | 1,03,1 | | 922 |
| 14 lbs. ½ | 0,51,5 | | |
| 7 " ¼ | 0,25,7 | | 4,0)15221,2 |
| 4 " ⅐ | 0,14,7 | | |
| | | | 7)3805,3 |
| Ans. | $67,95,0 | | 8)543,61 |
| | | | $67,95 |

NOTE. The answer may be found by calculating it at $1,12½ cts. per cwt. equal to $82,50 per ton.

4. How much will 4 tons 15 cwt. 2 qrs. 22 lbs. of iron come to, at $212,50 per 2240 lbs.? Ans. $1016,77,4.

| | *cwt.* | *qrs.* | *lbs.* | | | | |
|---|---|---|---|---|---|---|---|
| 5. | 32 | 1 | 5 | at 23*s.* 4*d.* | per cwt. | Ans. | £37 13 6$\frac{1}{2}$. |
| 6. | 27 | 3 | 25 | " $9,49 | " | | $265,46$\frac{1}{2}$. |
| 7. | 41 | 3 | | " 79*s.* 9*d.* | " | | £166 9 6$\frac{3}{4}$. |
| 8. | 6 | 1 | 25 | " 62*s.* | " | | 20 1 4. |
| 9. | 62 | 3 | 22 | " 72*s.* 6*d.* | " | | 228 3 7$\frac{1}{4}$. |
| 10. | 6 | 1 | 11 | " $12,50 | " | | $82,47,7. |
| 11. | 28 | 3 | 5 | " 15,40 | " | | 443,43,7. |
| 12. | 57 | 2 | 8 | " 77*s.* 9*d.* | " | | £223 16 2. |
| 13. | 19 | 3 | 13 | " 45*s.* 10*d.* | " | | 45 10 6. |

14. 37 tons, 14 cwt. 2 qrs. 14 lbs. of hemp at £89 6*s.* 8*d.* per ton. Ans. £3370 13 2.

15. 27 tons, 16 cwt. 3 qrs. 18 lbs. of hemp at £90 10*s.* per ton. Ans. £2520 0 5.

16. 24 tons, 18 cwt. 3 qrs. 18 lbs. of hemp at $289,50 per ton. Ans. $7221,73.

17. 31 tons, 16 cwt. of hemp at $268,75 per ton. Ans. $8546,25.

18. 19 tons, 14 cwt. 2 qrs. 12 lbs. of iron at $110 per ton. Ans. $2170,33,8.

19. 17 cwt. 3 qrs. 24lbs. of cordage at $14 per cwt. Ans. $251,50.

20. At £4 11 3 per cwt. what will 3 qrs. 25$\frac{1}{2}$ lbs. come to?

£4 11 3

| | | | | |
|---|---|---|---|---|
| 2 qrs. | $\frac{1}{2}$ | 2 | 5 | 7$\frac{1}{2}$ |
| 1 qr. | $\frac{1}{2}$ | 1 | 2 | 9$\frac{3}{4}$ |
| 14 lbs. | $\frac{1}{2}$ | 0 | 11 | 4$\frac{7}{8}$ |
| 7 | $\frac{1}{2}$ | 0 | 5 | 8$\frac{7}{16}$ |
| 3$\frac{1}{2}$ | $\frac{1}{2}$ | 0 | 2 | 10$\frac{7}{32}$ |
| 1 | $\frac{1}{7}$ | 0 | 0 | 9$\frac{87}{112}$ |

Ans. £4 9 2$\frac{125}{224}$.

21. What is the commission on £19 12 3, at 17$\frac{1}{2}$ per cent.? Ans. £3 8 7$\frac{23}{40}$.

22. A debt of £153 17 9 was discharged at 13*s.* 11$\frac{1}{4}$*d.* per pound, how much was received for it? Ans. £107 11 2$\frac{201}{320}$.

23. What will 19 tons, 19 cwt. 3 qrs. 27$\frac{1}{2}$ lbs. come to at £9 19*s.* 11$\frac{3}{4}$*d.* per ton? Ans. £399 19 5$\frac{1864}{17920}$.

## TARE AND TRET.

TARE and TRET are allowances made in selling goods by weight.

*Draft* is an allowance on the gross weight, in favor of the buyer or importer; it is always deducted before the *tare*.

*Tare* is an allowance made to the buyer for the weight of the hogshead, barrel, or bag, containing the commodity.*

*Gross* weight is the whole weight of the goods, together with the hogshead, barrel, or bag, &c. that contains them.

*Suttle* is when part of the allowance is deducted from the gross.

*Net* weight is what remains after all allowances are made.

EXAMPLES.

1. What is the net weight of 10 casks of alum, weighing gross 33 cwt. 2 qrs. 15 lbs., tare 15 lbs. per cask?

| | *cwt.* | *qrs.* | *lbs.* | |
|---|---|---|---|---|
| | 33 | 2 | 15 | gross. |
| 10×15=150= | 1 | 1 | 10 | tare. |
| Ans. | 32 | 1 | 5 | net. |

2. What is the tare of 138 cwt. 2 qrs. 8 lbs., tare 4 lbs. per cwt.?

4=1/28=

4)138 2 8 gross.

7)34 2 16

Ans. 4 3 22⅞ tare.

Or 138 at 1 lb.=1 0 26

4

4 3 20

2 qrs. 2

8 lbs. 0⅞

4 3 22⅞

3. What is the net weight of 42 boxes of sugar, weighing gross 21588 lbs.—allowing 4 lbs. per box for draft, and 15 per cent. for tare?

| | | |
|---|---|---|
| 21588 | gross | 21420 |
| 42×4= 168 | draft | 15 |
| 21420 | suttle | 107100 |
| 15 per ct. 3213 | tare | 21420 |
| Ans. 18207 | net lbs. | 321300 |

equal to 162 cwt. 2 qrs. 7 lbs.

* For Custom *House allowances, see American Duties.*

4. At 9 dol. 49 cts. per cwt. what will 3 hhds. of tobacco come to, weighing gross, viz.

| | Cwt. | qr. | lb. | lb. |
|---|---|---|---|---|
| No. 1. | 9 | 3 | 25 | tare 149 |
| 2. | 10 | 2 | 12 | 150 |
| 3. | 11 | 1 | 25 | 158 |

Ans. 265 dols. 46½ cts.

5. At 79*s.* 9*d.* per cwt. how much will 4 hhds. of madder come to, weighing gross, viz.

| | Cwt. | qr. | lb. | |
|---|---|---|---|---|
| No. 1. | 10 | 3 | 4 | |
| 2. | 11 | 2 | 13 | |
| 3. | 10 | 1 | 16 | |
| 4. | 14 | 3 | 19 | tare 14 lb. per cwt. |
| 14 lb. ⅛ | 47 | 2 | 24 | gross |
| | 5 | 3 | 24 | tare |
| | 41 | 3 | 0 | net. |

Ans. £166 9 6¾.

6. At 62*s.* per cwt. what will a hhd. of sugar come to, weighing gross 7 cwt. 1 qr.; tare 12 lb. per cwt.?

Ans. £20 1 4.

7. At 21 cents per lb. what will 6 hhds. of coffee come to, weighing gross, viz.

| | Cwt. | qr. | lb. | lb. |
|---|---|---|---|---|
| No. 1. | 7 | 1 | 14 | tare 96 |
| 2. | 8 | 2 | 21 | 98 |
| 3. | 7 | 1 | 21 | 91 |
| 4. | 6 | 3 | 25 | 90 |
| 5. | 7 | 0 | 23 | 89 |
| 6. | 8 | 1 | 12 | 100 |

Ans. 964 dols. 32 cents.

8. At 72*s.* 6*d.* per cwt. how much will 8 hhds. of sugar come to, weighing gross each 8 cwt. 3 qrs. 7 lb.; tare 12 lb. per cwt.? Ans. £228 3 7½.

9. At 23 cents per lb. what will 4 bags of coffee come to, weighing gross 450 lb.; tare 2 per cent. or 2 lb. per 100 lb.?

Ans. 101 dols. 43 cts.

10. At 12 dols. 50 cts. per cwt. what will 3 barrels of sugar come to, weighing gross, viz.

| | Cwt. | qr. | lb. | |
|---|---|---|---|---|
| No. 1. | 2 | 2 | 10 | |
| 2. | 2 | 1 | 21 | |
| 3. | 2 | 0 | 15 | tare 21 lb. per barrel? |

Ans. 82 dols. 47 cts. 7 mills.

11. At 15 dols. 40 cts. per cwt. what will 4 hhds. sugar come to, weighing gross, viz.

| | *Cwt.* | *qr.* | *lb.* | |
|---|---|---|---|---|
| No. 1. | 7 | 3 | 13 | |
| 2. | 8 | 1 | 10 | |
| 3. | 7 | 2 | 12 | |
| 4. | 8 | 1 | 21 | tare 12 lb. per cwt. |

Ans. 443 dols. 43 cts. 7 ms.

12. A. has in his possession a hhd. of sugar, weighing gross 9 cwt. 3 qrs. owned equally between him and B. It is required to know how much sugar he should weigh out to B. allowing tare 12 lb. per cwt.? Ans. 4 cwt. 1 qr. 11½ lb.

13. 5 casks of potashes 1st. sort, viz.

| | *Cwt.* | *qr.* | *lb.* | *lb.* |
|---|---|---|---|---|
| No. 1. | 3 | 2 | 0 | tare 45 |
| 2. | 3 | 2 | 10 | 44 |
| 3. | 3 | 1 | 7 | 43 |
| 4. | 3 | 2 | 7 | 46 |
| 5. | 3 | 3 | 0 | 44 |

At $5,40 cts. per cwt. Ans. $84,95 cts.

14. 4 casks of potashes 2d sort, viz.

| | *Cwt.* | *qr.* | *lb.* | *lb.* |
|---|---|---|---|---|
| No. 1. | 3 | 3 | 0 | tare 45 |
| 2. | 3 | 1 | 15 | 44 |
| 3. | 3 | 2 | 21 | 44 |
| 4. | 3 | 2 | 7 | 44 |

At $4,56⅔ cts. per cwt. Ans. $58,47 cts.

15. What is the gross weight of a hhd. of tobacco, weighing net 11 cwt. 1 qr.; tare 14 lb. per cwt.?

Ans. 12 cwt. 3 qrs. 12 lb.

## FELLOWSHIP

Is when two or more join their stocks, and trade together, dividing their gain or loss, in proportion to each person's share in the joint stock.

### *SINGLE FELLOWSHIP*

Is when different stocks are employed for a certain equal time.

RULE. As the whole stock is to the whole gain or loss, so is each man's particular stock to his particular share of the gain or loss.

EXAMPLES.

1. A. and B. buy certain merchandises, amounting to £120, of which A. pays £80, and B. £40, and they gain by them £32; what part of it belongs to each?

A. £80
B. 40

As 120 : 32 :: $\left\{\begin{matrix}80\\40\end{matrix}\right.$ Ans. £21 6 8 A.
10 13 4 B.

2. A ship worth $8400 being lost at sea, of which $\frac{1}{4}$ belonged to A. $\frac{1}{3}$ to B., and the remainder to C.; what loss will each sustain, supposing they have $6000 insured?

Ans. A.'s loss is $600, B.'s $800, and C.'s $1000.

3. A. and B. have gained $1260, whereof A. is to have 10 per cent. more than B.; what is the share of each?

Ans. A.'s $660, B.'s $600.

4. A bankrupt is indebted to A. $500 37 cts.; to B. $228; to C. $1291 23 cts.; to D. $709 40 cts.; and his estate is worth but $2046 75 cts.; how much does he pay per cent. and what is each creditor to receive?

Ans. He pays 75 per cent. and A.'s part is $375 $27\frac{3}{4}$ cts.; B.'s $171; C.'s $968 $42\frac{1}{4}$ cts.; and D.'s $532 05 cts.

5. Five persons, A. B. C. D. and E. have to share between them, the proceeds of an estate, sold by consent for $2515 74 cts. of which A. is to have $\frac{1}{3}$, B. $\frac{1}{4}$, C. $\frac{1}{6}$, D. $\frac{1}{8}$, and E. $\frac{1}{12}$; how much is each to receive?

Ans. A. $875,04; B. $656,28; C. $437,52; D. $328, 14; E. $218,76.

## *DOUBLE FELLOWSHIP*

Is when the stocks are employed for different times.

RULE. Multiply each man's stock by its time, and add them together; then say—As the sum of the products is to the whole gain or loss, so is the product of each man's stock and time to his share of the gain or loss.

EXAMPLES.

1. B. and C. trade in company; B. put in £950 for 5 months, and C. £785 for 6 months; and by trading they gain £275 18s. and 4*d.*; what is each man's part of the profit?

B's stock $950 \times 5 = 4750$
C.'s do. $785 \times 6 = 4710$

As 9460 : 275 18 4 :: $\left\{\begin{matrix}4750 : £138\ 10\ 10\ B\\4710 : 137\ 7\ 6\ C\end{matrix}\right.$

2. Two merchants enter into partnership for 16 months: A. put into stock at first $1200, and at the end of 9 months $200 more; B. put in at first $1500, and at the expiration of 6 months took out $500; with this stock they gained $772, 20 cts. What is each man's part of it?

Ans. A.'s $401 70 cts.; B.'s $370 50 cts.

3. Two persons hired a coach in Boston, to go 40 miles, for $20, with liberty to take in two more when they pleased. When they had gone 15 miles, they admit C. who wished to go the same route; and on their return, within 25 miles of Boston, they admit D. for the remainder of the journey.—As each person is to pay in proportion to the distance he rode, it is required to settle the coach hire between them.

Ans. A. and B. $6,40 each; C. $5,20; D. $2.

## SIMPLE INTEREST

Is a compensation made by the borrower of any sum of money to the lender, according to a certain rate per cent. agreed on for the principal only.

The legal rate of interest in Massachusetts is 6 per cent.

*Principal*, is the money lent.

*Rate*, is the sum per cent. agreed on.

*Amount*, is the principal and interest added together.

General Rule. Multiply the principal by the rate per cent. and divide the product by 100, and the quotient is the answer for one year.

When the principal is dollars only, multiply by the rate, and from the product point off two figures to the right; the figures to the left hand of the point give the answer in dollars, and the rest are decimal parts or cents.

If there are cents, &c. in the principal, multiply by the rate and point off as above. The figures to the left of the point give the answer in the same name with the lowest denomination in the principal.

Examples.

1. What is the interest of $158 for one year at 6 per cent. per annum?

158
6

Ans. $9,48 cents.

2. How much is the interest of $256,48 cents for 3 years and 9 months, at 6 per cent. per annum?

256,48
6
1538,88 for one year.
3
4616,64 for 3 years.
6=½ 769,44 for 6 months
3=¼ 384,72 for 3 months
cts. 5770,80 Ans. $57,70 cents.

*To find the interest of any sum for months at 6 per cent. per annum, by contraction.*

RULE. As half the months is equal to the rate for the time,—or, as the interest of any sum in dollars is one cent per dollar for every two months—multiplying the principal in dollars by the rate, or cents for the time, gives the answer.

EXAMPLES.

1. How much is the interest of $73 from the 6th of June to the 6th of October?

73 the principal.
2 equal the rate.
1,46 Ans. $1,46 cents.

2. How much is the interest of $193 from 16th May, 1824, to 16th November, 1825, at 6 per cent. per annum? Equal to 18 months.

193
9 cents per dollar.
1737 cents. Ans. $17,37.

*When the time is months and days.*—Take half of the months, and one-sixth of the days, for the rate or multiplier.

EXAMPLES.

1. How much is the amount of $284,60 cents for 2 years, 4 months and 24 days, at 6 per cent. per annum?

284,60 for 28 months and 24 days.
14,4
113840 Interest $40,98
398440 Principal 284,60
Cents 4098,240 Ans. $325,58 the amount.

2. How much is the interest of $133 for 5 months and 18 days, at 6 per cent. per annum?

138
6

8,28 for 1 year.

4 months $\frac{1}{3}$ = 2,76
1 " $\frac{1}{12}$ = 69
15 days $\frac{1}{2}$ = 34,5
3 " $\frac{1}{5}$ = 6,9

Ans. $3,86,4

Or, by taking half of the months and one-sixth of the days.

138
2,8

1104
276

$3,86,4 as before.

The multiplier 2,8 is found by taking half of 4, the even months, and $\frac{1}{6}$ of 30+13, for the odd month, added to the days.

3. What is the interest of $959 for 294 days, at 6 per cent. per annum?

959
294

3836
8631
1918

6,000)281,946

Ans. $46,99

By taking the year at 360 days.

365
100

6)36500

6083)281946(46,35
24332

38626
36498

21280
18249

30310
30415

by taking the year at 365 days.

$ cts.

4. $479 for 6 months, at 6 per ct. per an. Ans. $14,37.
5. 219 - 5 - - - 5 - - - - - - 4,56.
6. 746 - 4 - - - 4½ - - - - - 11,19.
7. 156 - 11 - - - 3¾ - - - - - 5,36.

| | | |

The following method of calculating the interest upon accounts, when there are partial payments, is sometimes used.

| 1798. | $ | | days. | pro. | princ. & time. |
|---|---|---|---|---|---|
| *January* 2, Lent——— | 100 | on interest for | 13 | - | 1300 |
| " 15, Lent——— | 110 | | | | |
| | 210 | - - | 5 | - | 1050 |
| " 20, Received | 162 | | | | |
| | 48 | - - | 14 | - | 672 |
| *February* 3, Lent——— | 95 | | | | |
| | 143 | - - | 7 | - | 1001 |
| " 10, Received | 90 | | | | |
| | 53 | - - | 6 | - | 318 |
| " 16, Lent——— | 186 | | | | |
| | 239 | - - | 10 | - | 2390 |
| " 26, Received | 70 | | | | |
| | 169 | - - | 3 | - | 507 |
| *March* 1, Lent——— | 250 | | | | |
| | 419 | - - | 2 | - | 838 |
| " 3, Received | 270 | | | | |
| | 149 | - - | 10 | - | 1490 |
| " 13, Received | 143 | | | | |
| " 20, time of adjust. | 6 | - - | 7 | - | 42 |
| | | | | | 9608 |

| | $cts. | |
|---|---|---|
| Then 6083)9608( | 1,57 | interest at 6 per cent. |
| 6083 | 6, | the principal due. |
| 35250 | 7,57 | the amount due March 20th. |
| 30415 | | |
| 48350 | | |
| 42581 | | |
| 5769 | | |

In computing interest on notes, when a settlement is made within a year from the date, or commencement of interest, it is generally the custom to find the amount of the principal from the time the interest commenced to the time of settlement, and likewise the amount of each payment, and then deduct the amount of the several payments from the amount of the principal.

EXAMPLE.

A., by his note dated April 25th, 1798, promises to pay to B. $774,76 on demand, with interest to commence four months after the date. On this note are the following endorsements:

Received, *October* 12*th*, 1798. - $260 19
" " 13*th*, " - 60
" *Novem.* 2*d*, " - 200

The settlement is made December 15th, 1798.

| CALCULATION. | $ | cts. |
|---|---|---|
| The principal carrying interest from 25th Aug. 1798 | 774 | 76 |
| Interest to Dec. 15th, 1798 - 3 ms. 20 days | 14 | 20 |
| Amount of the principal | 788 | 96 |
| First payment, Oct. 12th, 1798 - - | $260 | 19 |
| Interest to Dec. 15th, 1798, 2 ms. 3 days | 2 | 73 |
| Second payment, Oct. 13th, 1798 - | 60 | 00 |
| Interest to Dec. 15th, 1798, 2 ms. 2 days | 0 | 62 |
| Third payment, Nov. 2d, 1798, - - | 200 | 00 |
| Interest to Dec. 15th, 1798, 1 m. 13 days | 1 | 43 |
| Amount of payments | | 524 97 |
| Settlement is made for | | $263 99 |

*Dr.* *B.'s Interest Account.*

| | | |
|---|---|---|
| To interest of $715,00 for 230 days,* - - | | $27,40,8 |
| To " 496,75 " 185 " - - | | 15,32,4 |
| To " 874,19 " 106 " - - | | 15,44,0 |
| | | $58 17 2 |

*Cr.*

| | | |
|---|---|---|
| By interest of $913,27 for 179 days, | $27,23,8 | |
| By " 361,83 " 82 " | 4,94,7 | |
| By " 512,14 " 43 " | 3,66,9 | |
| | | 35,85,4 |
| Balance, - - | | $22,31,8 |

* Taking the year at 360 days.

*Calculation of the same by balance of products of money and time.*

| | | | | |
|---|---|---|---|---|
| *Dr.* | To $715,00 for 230 days, | - - products | | 164450 |
| | To 496,75 " 185 " | - - - | | 91945 |
| | To 874,19 " 106 " | - - - - | | 92644 |
| | | Products of Dr. | | 349039 |
| *Cr* | By $913,27 for 179 days | - | 163427 | |
| | By 361,83 " 82 " | - - | 29684 | |
| | By 512,14 " 43 " | - | 22016 | |
| | | Products of Cr. | | 215127 |
| | | Balance of products | | 133912 |

6,000)133,912

$22,31,8 as before.

In casting interest, it is customary to neglect the cents, if under 50; and if 50 or more, to add one to the dollars.

*RULE established by the Courts of Law in Massachusetts, for making up judgments on* Securities for Money *which are upon Interest, and on which partial payments have been endorsed.*

COMPUTE the interest on the principal sum, from the time when the interest commenced to the first time when a payment was made, which exceeds either alone or in conjunction with the preceding payments (if any) the interest at that time due: add the interest to that principal, and from the sum subtract the payment made at the time, together with the preceding payments (if any) and the remainder forms a new principal; on which compute and subtract the interest, as upon the first principal: and proceed in this manner to the time of the judgment. By this Rule, the payments are first applied to keep down the interest; and no part of the interest ever forms a part of a principal carrying interest.

The following example will illustrate the rule, in which the interest is computed at the rate of 6 per cent. by the year, that being the legal rate of interest in Massachusetts.

A., by his note, dated January 1, 1780, promises to pay B. 1000 dollars in six months from the date, with interest from the date.

On this note are the following endorsements:

Received April 1, 1780, $24.—Aug. 1, 1780, $4.—Dec. 1, 1780, $6.—Feb. 1, 1781, $60.—July 1, 1781, $40.—June 1, 1784, $300.—Sept. 1, 1784, $12.—Jan. 1, 1785,

$15—and Oct. 1, 1785, $50; and the judgment is to be entered Dec. 1, 1790.

## CALCULATION.

| | | |
|---|---|---|
| The principal sum carrying int. from Jan. 1, 1780 | | $1000 00 |
| Interest to April 1, 1780, 3 months | | 15 00 |
| Amount | | 1015 00 |
| Paid April 1, 1780, a sum exceeding the interest | | 24 00 |
| Remainder for a new principal | | 991 00 |
| Int. on $991 from Ap. 1, 1780, to Feb. 1, 1781, 10 m. | | 49 55 |
| Amount | | 1040 55 |
| Paid Aug. 1, 1780, a sum less than the interest then due | $4 00 | |
| Paid Dec. 1, 1780, do. do. | 6 00 | |
| Paid Feb. 1, 1781, do. greater than the interest then due | 60 00 | |
| | | 70 00 |
| Remainder for a new principal | | 970 55 |
| Interest on 970 dols. 55 cts. from Feb. 1, 1781, to July 1, 1781, (5 months) | | 24 26 |
| Amount | | 994 81 |
| Paid July 1, 1781, a sum exceeding the interest | | 40 00 |
| Remainder for a new principal | | 954 81 |
| Interest on 954 dols. 81 cts. from July 1, 1781, to June 1, 1784, (2 years 11 months) | | 167 09 |
| Amount | | 1121 90 |
| Paid June 1, 1784, a sum exceeding the interest | | 300 00 |
| Remainder for a new principal | | 821 90 |
| Interest on 821 dols. 90 cts. from June 1, 1784, to Oct. 1, 1785, (1 year 4 months) | | 65 75 |
| Amount | | 887 65 |
| Paid Sept. 1, 1784, a sum less than the interest due, | $12 00 | |
| Paid Jan. 1, 1785, do. do. | 15 00 | |
| Paid Oct. 1, 1785, do. greater with two last payments than the interest then due | 50 00 | |
| | | 77 00 |
| Remainder for a new principal | | 810 65 |
| Interest on 810 dols. 65 cts. from Oct. 1, 1785, to Dec. 1, 1790, the time when judgment is to be entered (5 years 2 months) | | 251 30 |
| *Judgment* rendered for the amount | | 1061 95 |

*The following statement of the same Note shows the interest and principal more distinctly separate.*

| | | |
|---|---|---|
| 1 principal - commencing Jan. 1, 1780, | | $1000 0 |
| 1 pay't $24, less $15, for int. due " April 1, " | | 9 0 |
| 2 principal - commencing " 1, " | | 991 0 |
| 2 payment 4 less than the int. due " Aug. 1, " | | |
| 3 do. 6 " " " " Dec. 1, " | | |
| 4 do. 60 " - - - Feb. 1, 1781, | | |
| 70 less $49,55, for interest then due | | 20 4 |
| 3 principal - commencing Feb. 1, " | | 970 5 |
| 5 pay't 40 less $24,26, for int. due " July 1, " | | 15 7 |
| 4 principal - commencing " 1, " | | 954 8 |
| 6 pay't 300 less $167,09, for in. due " June 1, 1784, | | 132 9 |
| 5 principal - commencing " 1, " | | 821 9 |
| 7 pay't 12 less than the int. due " Sept. 1, " | | |
| 8 do. 15 " " " " Jan. 1, 1785, | | |
| 9 do. 50 " " " " Oct. 1, " | | |
| 77 less $65,75, for int. then due, - - | | 11 2 |
| 6 principal - commencing Oct. 1, " | | 810 6 |
| 10 payment 1061,95, less $251,30, for interest due Dec. 1, 1790, - - - - - | | 810 6 |

## RECAPITULATION.

| | | *payments* | | *thus applied.* | | |
|---|---|---|---|---|---|---|
| 1780 April 1 | Received | $24,00 | int. | $15,00 | principal | $9 0 |
| Aug. 1 | " | $4 | | | | |
| Dec. 1 | " | 6 | | | | |
| 1781 Feb. 1 | " | 60 | | | | |
| | | — 70,00 | " | 49,55 | " | 20 4 |
| July 1 | " | 40,00 | " | 24,26 | " | 15 7 |
| 1784 June 1 | " | 300,00 | " | 167,09 | " | 132 9 |
| Sept. 1 | " | 12 | | | | |
| 1785 Jan. 1 | " | 15 | | | | |
| Oct. 1 | " | 50 | | | | |
| | | — 77,00 | " | 65,75 | " | 11 2 |
| 1790 Dec 1 | " | 1061,95 | " | 251,30 | " | 810 6 |
| Amount received | | $1572,95 | | $572,95 | princ. | $1000 0 |
| | | | | | interest | 572 9 |
| | | | | | | $1572 9 |

775096 A

*The following example shows how the Massachusetts and Connecticut Court-Rules for calculating interest differ.*

B. borrows of C, $1500, on his note at 6 per cent. per an. At the expiration of 6 months he pays $1000, which is endorsed on his note, and in 6 months after, he pays it in full. Required the amount due at the expiration of the year.

| *In Massachusetts.* | | *In Connecticut.* | |
|---|---|---|---|
| Principal - - | $1500 | Principal - | $1500 |
| 6 month's interest - | 45 | one year's interest | 90 |
| | 1545 | | 1590 |
| payment - - | 1000 | payment - $1000 | |
| | 545 | int. of 1000 for 6 m. 30 | 1030 |
| int. of $545 for 6 mo. | 16,35 | | |
| Amount due | $561,35 | *Amount due | $560 |

*A TABLE, showing the number of Days from any Day in any Month, to the same Day in any other Month, through the Year.*

| *From* | Jan. | Feb. | Mar. | Apr. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *To* Jan. | 365 | 334 | 306 | 275 | 245 | 214 | 184 | 153 | 122 | 92 | 61 | 31 |
| Feb. | 31 | 365 | 337 | 306 | 276 | 245 | 215 | 184 | 153 | 123 | 92 | 62 |
| Mar. | 59 | 28 | 365 | 334 | 304 | 273 | 243 | 212 | 181 | 151 | 120 | 90 |
| Apr. | 90 | 59 | 31 | 365 | 335 | 304 | 274 | 243 | 212 | 182 | 151 | 121 |
| May | 120 | 89 | 61 | 30 | 365 | 335 | 304 | 273 | 242 | 212 | 181 | 151 |
| June | 151 | 120 | 92 | 61 | 31 | 365 | 335 | 304 | 273 | 243 | 212 | 182 |
| July | 181 | 150 | 122 | 91 | 61 | 30 | 365 | 334 | 303 | 273 | 242 | 212 |
| Aug. | 212 | 181 | 153 | 122 | 92 | 61 | 31 | 365 | 334 | 304 | 273 | 243 |
| Sept. | 243 | 212 | 184 | 153 | 123 | 92 | 62 | 31 | 365 | 335 | 304 | 274 |
| Oct. | 273 | 242 | 214 | 183 | 153 | 122 | 92 | 61 | 30 | 365 | 334 | 304 |
| Nov. | 304 | 273 | 245 | 214 | 184 | 153 | 123 | 92 | 61 | 31 | 365 | 335 |
| Dec. | 334 | 303 | 275 | 244 | 214 | 183 | 153 | 122 | 91 | 61 | 30 | 365 |

*The payment of $1000 being "made before one year's interest had accrued, and being *more* than the interest arisen at the time of such payment, the interest is computed on it, from the time it was paid, up to the end of the year, and added to the payment, the sum is deducted from the principal and interest added as above."—*Kirby's Reports, page* 49.

*The Use of the Table.*

Suppose the number of days between the 3d of May and the 3d of November was required; look in the column under May for November, and against that month you will find 184.

If the given days be different, it is only adding or subtracting their inequality to or from the tabular number. Thus, from May 3d to Nov. 17th is 184+14=198 days, and from Nov. 17th to May 3d is 181—14=167 days.

If the time exceed a year, 365 days must be added; thus, from the 4th of February, 1798, to the 4th of Sept. 1799, is 212+365=577 days.

NOTE. In leap years, if the end of the month of February be in the time, one day must be added on that account.

## *COMPOUND INTEREST*

Is that which arises both from the *principal* and *interest*; that is, when the interest on money becomes due, and not paid, it is added to the principal, and interest is calculated on this amount as on the principal before.

RULE. Find the simple interest of the given sum for one year, and add it to the principal, and then find the interest for that amount for the next year, and so on for the number of years required. Subtract the principal from the last *amount*, and the remainder will be the compound interest.

EXAMPLES.

1. Required the amount and interest of $629 for 7 years, at 6 per cent. per annum, compound interest?

| | | | | | |
|---|---|---|---|---|---|
| | | 629,00 | principal for | 1st | year. |
| $629,00 | ×6÷100 | 37,74 | interest | 1st | " |
| | | 666,74 | principal | 2d | " |
| 666,74 | " " | 40,00,4 | interest | 2d | " |
| | | 706,74,4 | principal | 3d | " |
| 706,74,4 | " " | 42,40,4 | interest | 3d | " |
| | | 749,14,8 | principal | 4th | " |
| 749,14,8 | " " | 44,94,9 | interest | 4th | " |
| | | 794,09,7 | principal | 5th | " |
| 794,09,7 | " " | 47,64,6 | interest | 5th | " |

| | | | | | |
|---|---|---|---|---|---|
| | | 841,74,3 | principal | 6th | " |
| 841,74,3 | " " | 50,50,5 | interest | 6th | " |
| | | 892,24,8 | principal | 7th | " |
| 892,24,8 | " " | 53,53,5 | interest | 7th | " |
| | Ans. | $945,78,3 | amount | | |
| | | 629,00,0 | principal | | |
| | | $316,78,3 | interest. | | |

*A TABLE showing the amount of one pound or one dollar, for any number of years under 33, at the rates of 5 and 6 per cent. per annum, compound interest.*

| *Years.* | 5 *Rates.* 6 | | *Years.* | 5 *Rates.* 6 | |
|---|---|---|---|---|---|
| 1 | 1,05000 | 1,06000 | 17 | 2,29201 | 2,69277 |
| 2 | 1,10250 | 1,12360 | 18 | 2,40662 | 2,85434 |
| 3 | 1,15762 | 1,19101 | 19 | 2,52695 | 3,02559 |
| 4 | 1,21550 | 1,26247 | 20 | 2,65329 | 3,20713 |
| 5 | 1,27628 | 1,33822 | 21 | 2,78596 | 3,39956 |
| 6 | 1,34009 | 1,41852 | 22 | 2,92526 | 3,60353 |
| 7 | 1,40710 | 1,50363 | 23 | 3,07152 | 3,81975 |
| 8 | 1,47745 | 1,59384 | 24 | 3,22510 | 4,04893 |
| 9 | 1,55132 | 1,68948 | 25 | 3,38635 | 4,29187 |
| 10 | 1,62889 | 1,79084 | 26 | 3,55567 | 4,54938 |
| 11 | 1,71034 | 1,89829 | 27 | 3,73345 | 4,82234 |
| 12 | 1,79585 | 2,01219 | 28 | 3,92013 | 5,11168 |
| 13 | 1,88565 | 2,13292 | 29 | 4,11613 | 5,41838 |
| 14 | 1,97993 | 2,26090 | 30 | 4,32194 | 5,74349 |
| 15 | 2,07892 | 2,39655 | 31 | 4,53804 | 6,08810 |
| 16 | 2,18287 | 2,54035 | 32 | 4,76494 | 6,45388 |

The use of this Table is plain and easy—for multiplying the figures standing against the number of years, by the given principal, the product is the amount required.

EXAMPLES.

1. What is the amount of $629 for 7 years, at 6 per cent. per annum, compound interest?

1,50363 the tabular number for 7 years.
629
1353267
300726
902178
945,78327 Ans. $945,78.

2. How much will £2 8*s.* amount to in 28 years, at 6 per cent. per annum, compound interest? Ans. £12 5 4¼

## COMMISSION AND BROKERAGE.

COMMISSION and BROKERAGE are compensations to Factors and Brokers for their respective services.

The method of operation is the same as in Simple Interest

EXAMPLES.

1. What is the commission on $1974 at 5 per cent.?

1974
5

98,70 Ans. $98,70.

2. The sales of certain goods amount to $1873,40; what sum is to be received for them, allowing 2½ per cent. for commission, and ¼ per cent. for prompt payment of the net proceeds? Ans. $1821 99 cts. 9 m.

*To invest or purchase, so as to reserve the commission, or net to overship net proceeds.*

As 100 more the commission on the intended purchase is to 100, so is the proposed sum to that to be laid out or invested.

EXAMPLES.

1. A factor has in his hands $709,80, and being directed to invest it in purchasing certain goods, how much can he invest so as to reserve his commission of 5 per cent. on the purchase?

100
5

105 : 100 :: 709,80
100

105)70980,00(676
630

798
735

630
630

Ans. $676.

2. As the commission in this case is an even part of 100 say $\frac{1}{21}$, deducting $\frac{1}{21}$ part of the given sum will give the amount to be laid out or invested—thus

$\frac{1}{21}$ { 3)709,80 Net proceeds
{ 7)236,60

33,80 Commission

Ans. $676,00 to be invested.

If at $2\frac{1}{2}$ per cent. or $\frac{1}{40}$ part, deducting $\frac{1}{41}$ would give the answer.

3. A factor has in his hands 3690 dollars, which he is directed to lay out in iron, reserving from it his commission of $2\frac{1}{2}$ per cent. on the purchase; the iron being 95 dollars per ton, how much did he purchase?

Ans. 37 tons, 17 cwt. 3 qrs. $16\frac{4}{19}$ lbs.

## INSURANCE.

INSURANCE is a contract by which the Insurer undertakes, in consideration of a stipulated premium, to indemnify the person insured from loss, or damage to the property at risk, by certain perils enumerated in the contract.

The instrument which is the evidence of this contract, is called a *Policy of Insurance.*

The premium is the sum paid by the person insured, to him who insures, for taking the risk.

The insured [or assured] is the person who owns the property at hazard, which is the subject of the contract.

Some policies contain a stipulation that the Insurer shall not be liable for *partial* losses under *five* per cent.;—others *ten* per cent.—but for *general averages* the Insurer is liable be they ever so small.

A *General Average* signifies a contribution made by the Owners of the Ship, Cargo and Freight, paid by each in proportion to the amount saved of each, toward any particular loss or expense voluntarily incurred, as by the cutting away of a mast or cable, hiring extra men, when in distress, &c. for the general safety of the ship and all on board, in order that he whose goods may have been thus sacrificed,

or he whose money may have been thus expended, may lose no more, and that all others interested in Ship, Cargo, or Freight, may lose no less than their proportional part.

A *Partial Loss* is a loss by the perils against which the Insurer has undertaken to indemnify, in the ordinary prosecution of the Voyage, and not voluntarily incurred;—as if a vessel's masts be swept away by the force and violence of the winds—or goods be damaged by the straining of the ship, so as to cause her to leak.

Total Losses are of two kinds—*absolute*, and *legal* or *technical*.

An *absolute* total loss is when the Ship or Property insured is entirely destroyed, as if they be sunk or consumed by fire.

A *legal* or *technical* total loss is when the loss is of that nature and extent, which authorizes the Assured to abandon the property insured to the Insurer.—As if a vessel be so much damaged by perils, insured against, as to require repairs exceeding one half of her value, after deducting one third from the cost of repairs, for the difference between new and old, according to an established rule;—or if goods be damaged to more than half their value. In such cases, if the Assured abandon, it is a total loss with Salvage. If he does not abandon, it is settled as a partial loss.—The Assured is never obliged to abandon; but under these circumstances he has the option to abandon the property insured to the Insurer, who is thereupon obliged to pay the sum insured upon it, and take what may be saved. Or he (the Assured) may keep what is saved, and claim and recover, as for a *partial* loss, as he may deem most for his interest.

Losses are generally made payable in sixty days after proof is presented, but the parties may vary this term by special agreement.

Policies usually contain a stipulation, that in case of loss, the Insurer shall be allowed to deduct one per cent.

A person may insure the whole or any part of his property. If he insures a part only, he is considered as being himself the insurer of the residue.—To insure the whole, he must not only insure the cost and charges, or value of the property, at the port of Shipment, but he must cover his premium and the one per cent. abatement, together with the commission paid for making the Insurance and for collecting the loss if any be paid.—To ascertain what sum must be

insured to cover the premium and charges, he must first ascertain what sum will be covered by insuring 100 dollars, and so many times as this sum is contained in the sum to be covered, so many hundred dollars he must insure—thus,

| | |
|---|---|
| Suppose A. ships an adventure, the cost of which is | $1000 |
| The shipping charges and packages - - - - | 50 |
| | 1050 |

He wishes to cover this sum at a premium of 5 per cent. by which is to be understood, that he wishes to insure that amount which will authorize him to receive of the Insurers $1050 in case of a total loss.

| | |
|---|---|
| The sum to be covered is - - | $1050 |
| Add the cost of the policy - - | 1 |
| | $1051 |

The premium is *five* per cent.—Commission for making the insurance *half* per cent. and for collecting the loss, *one* per cent.

For the Insurance of 100 dollars, he will receive in case of total loss - - - - - - - $100 00

Subject to deduction, viz.

| | | |
|---|---|---|
| For Premium - - - - - | $5,00 | |
| Abatement - - - - - | 1,00 | |
| Commission for making Insurance | 0,50 | |
| " " recovering Loss | 1,00 | |
| | | 7 50 |
| | | 92 50 |

The insurance of 100 dollars therefore leaves 92 dols. 50 cts. only, and as many times as 92 dols. 50 cts. are contained in 1051 dols. so many times 100 dollars must he insure.

62,50 : 1051 : : 100 : $1136,21 to be insured.

PROOF.

| | | |
|---|---|---|
| Sum insured - - - - - - - | | $1136 21 |
| Deduct, viz. | | |
| 5 per cent. premium - - - | $56 81 | |
| Policy - - - - - - | 1 00 | |
| 1 per cent. abatement - - - | 11 36 | |
| ½ per cent. Commission - - - | 5 68 | |
| 1 per cent. for collecting - - | 11 36 | |
| | | 86 21 |
| The sum to be covered | | $1050 00 |

## AVERAGE.

THE word Average, when applied to Marine Insurance, originally signified a proportionate division of any damage among the parties concerned in any risk at sea. It is now used, however, for all losses, damages, &c. short of a *total loss*.

General average may arise from two causes: *first*, from a sacrifice deliberately made of the property of *one* of the *parties*, concerned in the adventure for the benefit of the others, whereby his *loss* is turned to their *gain;* and of course, he has a right to claim restitution. *Secondly*, a claim may arise from expense incurred, or services performed, by one party; for example, the ship-master may incur expenses for the general benefit, and, therefore, he has a right to claim a remuneration.

Particular Average, as understood at Lloyd's, signifies a *partial loss* of the *ship* or *cargo*, arising from the common accidents of the sea, and must be borne by the owners of the property that suffer the damage; and underwriters are liable for particular or general average in proportion to the sums which they have underwritten.

If goods *arrive* but *damaged*, the underwriter must pay the owners such proportion of the prime cost, or value mentioned in the policy, as corresponds with the proportion of the diminution in value, occasioned by the damage.

On the average being adjusted, after the *arrival* of the ship, the *wages* of the *seamen* must be *deducted* from the *freight*, and the *remainder* is the sum liable to contribution. But it is necessary to remark that before proportioning the loss, *each* of the *interests*, viz. the *cargo*, the *ship*, and the *freight*, after the value is ascertained, must be cleared of all charges attached to it.

In computing a general average for masts, rigging, &c. cut away, a deduction is made of one-third, from the cost of replacing them, as the new articles are supposed to be so much better than the old; but goods thrown overboard are valued at the sum they would have brought, had they arrived. But if the average claim is settled at the port of *loading*, the goods are valued at the *invoice* price.

GENERAL RULE. As the whole value, subject to *contribution*, is to the whole loss, so is each person's share of that

value, to his proportional average of the loss, or so is $100, or £100, to the average loss *per cent.*

1. What should the following be valued at, in calculating an average, viz.

| | | | |
|---|---|---|---|
| 30 tons old sable iron | cost | $105,00 | per ton. |
| 60 pieces sail cloth | " | 23,00 | per piece. |
| 109 " ravens' duck | " | 12,25 " | " |
| 10 " sheeting | " | 17,25 " | " |
| Freight of the iron - | $270,00 | Duty 305,02 | |
| do. sail cloth, &c. - | 59,96 | " 417,30 | |

*Thus calculated.*

| | | | |
|---|---|---|---|
| Cost of the iron - - - | | $3150,00 | |
| Freight - - - - | 270,00 | | |
| Duty - - - - | 305,02 | | |
| | | 575,02 | |
| | | | $2574,98 |
| Cost of sail cloth - | $1380,00 | | |
| " ravens' duck - | 1335,25 | | |
| " sheeting - | 172,50 | | |
| | | 2887,75 | |
| Freight of sail cloth, duck and sheeting - | 59,96 | | |
| Duty - - - | 417,30 | | |
| | | 477,26 | |
| | | | 2410,49 |

Ans. Net value $2985,47

2. A ship, in her passage from Amsterdam to ——, having received much damage in a gale, bore away for Ireland, where she arrived on the 5th October; and having received the necessary repairs, was ready for sea on the 23d December. Allowing $377 per month for the wages of the captain and crew, and 33⅓ cents each per day for 14 men,* what did the whole amount to, in calculating the average.

| | | | | | | |
|---|---|---|---|---|---|---|
| Oct. 26 | If 30 | : | 377 | :: | 79 | : $992,76 for wages. |
| Nov. 30 | 1 | : | 4,66⅔ | :: | 79 | : 368,67 " board. |
| Dec. 23 | | | | | | |

Ans. 1361,43

79 days.

3. In consequence of damage at sea, and expenses thereby incurred, the ship Massachusetts, freight and cargo deliv-

* One third of the monthly wages is generally allowed for board.

and, amounting in the whole to $75240, have to make good $7561,62. What is the average loss per cent. ?

If 75240 : 7561,62 : : 100 Or, 75240 : 7561,62 : : 1 dol.
100 1

7524,0)7561620,0(1005 75240)756162(10,05 cts.
7524 75240

37620 3762,00
37620 3762,00

Ans. 10,05 per cent. or, 10,05 cts. per dollar.

4. It is required to know how much is to be charged to each of the following, interested in the preceding statement, viz.

| | | | |
|---|---|---|---|
| Ship valued at | $6586,00 | at $10,05 per cent. | $661,89 |
| Freight - - - | 4420,14 | - - - - - - | 444,22 |
| A.'s goods - - | 39341,28 | - - - - - - | 3953,80 |
| B.'s " - - - | 21790,41 | - - - - - - | 2189,94 |
| C.'s " - - - | 1443,72 | - - - - - - | 145,09 |
| D.'s " - - - | 388,14 | - - - - - - | 39,01 |
| E.'s " - - - | 101,59 | - - - - - - | 10,21 |
| F.'s " - - - | 1168,72 | - - - - - - | 117,46 |
| | $75240,00 | | $7561,62 |

## FREIGHT.

FREIGHT, in navigation and commerce, is the consideration of money agreed to be paid for the use or hire of a ship, or, in a larger sense, the burthen of such ship.

1. What is the freight of 1776 cwt. 2 qrs. 24 lbs. of sugar to Amsterdam, at £5 sterling per ton, equal to 5s. per cwt.

1776 2 24
5
8880
2 qrs 2 6
16 lbs. 0 9
8 lbs. 0 4
2,0)888,3 7
£444 3 7 Equal to $1974,13 cts.

2. What is the freight of 393 cwt. 2 qrs. 24 lbs. of coffee, at 90*s.* per 2000 lbs.?

39300
4716
56
24
44096
90
2,000)3968,640
20)1984,320
£99 4 3

3. What will the freight of 6 tons 4 cwt. 2 qrs. 18 lbs. of sugar, delivered at Trieste, amount to at £4 ster. per ton?
nn nn Ans. £24 18 7¾.

4. What is the freight of 12 boxes, measuring 249 feet 4 inches at 2*s.* per foot? Ans. £24 18 8.

The readiest way for casting freight is to have a table previously made, thus—at the preceding rate of £4.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 Ton | is | £4 0 0 | | 14 lbs. | is | £0 0 6 |
| 1 Cwt. | " | 0 4 0 | | 7 lbs. | " | 0 0 3 |
| 1 Quarter | " | 0 1 0 | | 5 lbs. | " | 0 0 2 |
| 21 lbs. | " | 0 0 9 | | 2 lbs. | " | 0 0 1 |

*Use of the Table.*

1. Required the freight of *T.* 15 *C.* 4 *qr.* 2 *lb.* 3 at £4 ster. per ton.

| | | | | | | |
|---|---|---|---|---|---|---|
| 15 tons at £4 | - | is | - | - | £60 | 0 0 |
| 4 cwt. | 4*s* | - | " | - | - | 0 16 0 |
| 2 qrs. | 1*s.* | - | " | - | - | 0 2 0 |
| 3 lbs. | - | - | " | - | - | 0 0 1½ |

Ans. £60 18 1½
Or, $270,70 by the table.

2. Required the freight of the following goods in the Camillus, delivered in Trieste, at £4 sterling per ton.

| | *T.* | *C.* | *qr.* | *lb.* | | | | |
|---|---|---|---|---|---|---|---|---|
| A.'s goods | 31 | 19 | 0 | 15 | | | | |
| B.'s " | 21 | 19 | 3 | 22 | | | | |
| C.'s " | 66 | 6 | 3 | 14 | | | | |
| Ans. | A.'s | £127 | 16 | 7 | or, | $568,13. |
| | B.'s | 87 | 19 | 9½ | | 391,07. |
| | C.'s | 265 | 7 | 6 | | 1179,44. |

S. G.'s freight in the Camillus, making part of the return cargo from Trieste to Boston, viz.

| | | | |
|---|---|---|---|
| 16 | boxes soap - - | 8742 lbs. | Trieste. |
| 20 | pigs lead - - - | 4080 " | " |
| 12 | kegs quicksilver - - | 1800 " | " |
| | | 14622 " | " |

What would it amount to in Boston, at £4 ster. for 2000 lbs. —100 lbs. Trieste or Vienna weight being equal to 123 lbs. English ?

| | | |
|---|---|---|
| | 14622, | |
| At 20 | 2924,4 | |
| 2 | 292,4 | |
| 1 | 146,2 | |
| | 17985, | |
| | 2 | £ per 1000 lbs. |
| | 35,970 | |
| | 20 | |
| | 19,400 | |
| | 12 | |
| | 4,800 | |

Ans. £35 19 5 $159,87.

An estimate of the quantity of certain goods calculated to make a ton in freight, viz.

| | | | | | |
|---|---|---|---|---|---|
| 60 | Bolts of | Sail-Cloth. | 2000 | lbs. | Coffee. |
| 70 | Half-p's | Duck. | 12 | Cwt. | Indigo. |
| 80 | Pieces | Sheeting. | 16 | " | Pepper. |
| 90 | " | Ravens' Duck. | 20 | " | Rice. |
| 120 | " | Drillings. | 20 | " | Sugar. |
| 1 | Hhd. | Tobacco. | 20 | " | Salt Petre. |
| 252 | Gallons | Liquors. | 16 | " | Turmeric. |
| 236 | " | Oil. | 16 | " | Ginger. |
| 800 | lbs. | Cotton. | | | |

40 Cubic feet in Merchants' ships.

When freight is per barrel, five cubic feet of other goods are allowed for a barrel.

It would be well, if in making contracts for freight in foreign ports, captains or supercargoes would ascertain the contents of merchandise by actual measurement. This is the more necessary, as the customary rate of the tonnage of some goods differs from the true contents.

## PRIMAGE.

PRIMAGE is a certain allowance paid by the shipper or consignee of goods, to the master of a vessel, for loading the same.

What is the primage on the following sums at 5 per cent. viz.

A.'s freight of £813 11 8 sterling.
B.'s " 321 5 3 "
C.'s " 675 2 3 "

Ans. On A.'s freight £40 14 7 or $181,02
B.'s " 16 1 3 71,38½
C.'s " 33 15 1 150,01

## BUYING AND SELLING STOCKS.

STOCK, in the sense in which it is here used, is a fund established by government or individuals in a corporate capacity, the value of which is variable.

EXAMPLES.

1. What is the amount of $1565 national bank stock, at 134 per cent.?

1565
134
6260
4695
1565
2097,10 Ans. $2097 10 cts.

2. What is the amount of $2958 bank stock, at 25 per cent. advance?

2958
25 ¼ 739,50
3697,50 Ans. $3697 50 cts.

3. $6959 of 8 per cent. stock at 110 per ct. Ans. 7654,90
4. 1796 6 - - - 91⅛ - - 1643,34
5. 1284 3 - - - 54¼ - - 696,57
6. 3172 deferred - - 89 - - 2823,08

## DISCOUNT.

DISCOUNT is the abating of so much money to be received before it is due, as that money, if put at interest, would gain in the same time and at the same rate.

Thus $100 would discharge a debt of $106 payable in 12 months, discount at 6 per cent. per annum, because the $100 received would, if put to interest, regain the $6 discount.

RULE. As $100, with the interest for the given time, is to 100, so is the given sum to the present worth, and the difference between the present worth and the given sum is the discount.

EXAMPLES.

1. What is the present worth of $450 due in 6 months, discount at 6 per cent. per annum?

6 *m.* $\frac{1}{2}$ 6

3

100

103 : 100 :: 450 *d.*

Ans. $436 89 cts.

2. How much is the discount of £308 15*s.* due in 18 months, at 8 per cent. per annum? Ans. £33 1 7$\frac{1}{4}$.

3. What is the present worth of $5150 due in 4$\frac{1}{2}$ months, discounting at the rate of 8 per cent. per annum, and allowing one per cent. for prompt payment? Ans. $4950.

4. A. is to pay $5927 on the 19th of April, 1799, and $5989 the 19th of July following: it is required to know how much money will discharge both sums on the 19th of January, 1799, discounting at 8 per cent. per annum?

Ans. $11569,43.

Though the discount found by the preceding method is thought to be the sum that should be deducted for present payment in justice to both parties, yet in business the interest for the time is taken for the discount.

EXAMPLES.

5. What ready money will discharge a note of $150, due in 60 days, allowing legal interest, or 6 per cent per annum, as discount?

150
1=half the months.

1,50

150 the debt.
1,50 the interest.

148,50 Ans. $148,50.

6. Bought goods to the amount of 950 dollars, at 90 days credit: what ready money will discharge it, allowing the interest for the time at 6 per cent. per annum, as discount?

Ans. $935,75 if calculated for 3 months.
$935,95 if calculated for 90 days.

When the interest for the time is allowed as discount, it is presumed that neither party suffers any loss: but the following statement evinces the contrary.

A. owes B. $100, payable in 12 months, for present payment of which B. allows $6, or the interest for the time, and receives $94; this sum he immediately lends to C. for the same space of time, and then receives the amount, being 99 dols. 64 cents, which is 36 cents less than he would have to receive from A. had he left the money in his hands; but if he had allowed A. the discount, and not the interest, for the time, he would have received from him 94 dols. 34 cents, and this sum being put to interest, would amount to 100 dols. in one year, which shows that the discount, and not the interest, is the just deduction for prompt payment.

But when discount is to be made for present payment, without any regard to time, the interest of the sum, as calculated for a year, is the discount.

EXAMPLES.

7. How much is the discount of 853 dols. at 2 per cent.?

853
2

$17,06 Ans. $17,6.

8. How much money is to be received for $985,75, discounting 4 per cent.? Ans. $946,32.

| | | | | | |
|---|---|---|---|---|---|
| 9. | $6,50 | discounting | 10 | per cent. is | $5,85. |
| 10. | 2,50 | " | 16 | - - | 2,10. |
| 11. | 4,50 | " | 16⅔ | - - | 3,75. |
| 12. | 15,80 | " | 15 | - - | 13,43. |
| 13. | 11,20 | " | 12½ | - - | 9,80 |

| | | | | | |
|---|---|---|---|---|---|
| 14. | 43,60 | discounting | 35 per cent. is | | 28,34. |
| 15. | 196,50 | " | 22 | - - | 153,27. |
| 16. | 594,20 | " | 25 | - - | 445,65. |
| 17. | 895,62 | " | 33⅓ | - - | 597,08. |

Required the interest and discount of the following sums, at 6 per cent. per annum.

| | | | | *interest.* | *discount.* |
|---|---|---|---|---|---|
| 18. | $896,50 | payable in | 10 months. | Ans. $44,82½ | $42,69 |
| 19. | 875,00 | " | 7 | 30,62½ | 29,59 |
| 20. | 796,00 | " | 8 | 31,84 | 30,61½ |
| 21. | 980,75 | " | 9 | 44,13 | 42,23 |

*To raise the price of goods, so as to discount without loss.*

RULE. As 100, less the discount, is to 100, so is the present price, to the price required. Or as 100, less the discount, is to the discount, so is the present price or value, to the sum to be added.

EXAMPLES.

1. The present worth of certain goods is $930.; at what must they be valued to allow 7 per cent. discount, without loss?

100 Or 93 : 7 :: 930
7 7

93 : 100 :: 930 93)6510
100 $70 to be added.

93)93000

1000 Ans. $1000.

2. A parcel of goods is charged at £54 14 7, how must it be valued to allow 10 per cent. without loss?

Ans. £60 16 2½.

## *BANK DISCOUNT.*

1. What is the Bank Discount of $563,74 for 30 days with grace?

563,74
⅓ of 33 = ,5½

281870
28187

cts. 310,057 Ans. 3,10.

2. What is the discount of $686,74 for 63 days?

686,74
⅓ of 63 = 1,0½

686740
34337

cts. 721,077 Ans. $7,21.

3. Required the discount of $567 for 129 days?

567
129
5103
6804
6)73,143
Ans. $12,19

4. What is the discount of $385 for 119 days?

385
119
3465
4235
6)45,815
7,636 Ans. $7,64.

## EQUATION OF PAYMENTS.*

THE design of this Rule is to find a mean time for the payment of several sums due at different times.

RULE. Multiply each sum by its time, and divide the sum of the products by the whole debt; the quotient is accounted the mean time.

EXAMPLES.

1. A. owes B. 200 dollars, whereof 40 dollars is to be paid in 3 months, 60 dollars in 5 months, and the remainder in 10 months; at what time may the whole be paid without any injustice to either?

| $ | | mo. | | |
|---|---|---|---|---|
| 40 | × | 3 | = | 120 |
| 60 | × | 5 | = | 300 |
| 100 | × | 10 | = | 1000 |
| 200 | | | | 200)1420 |

7 months and 3 days.

2. A. is indebted to B. £120, whereof one half is to be paid in 3 months, one quarter in 6 months, and the remainder in 9 months; what is the equated time for the payment of the whole? Ans. 5 months and 7½ days.

3. C. owes D. $1400, to be paid in 3 months; but D. being in want of money, C. pays him at the expiration of 2 months, $1000; how much longer than 3 months ought C., in equity, to defer the payment of the rest?

Ans. 2½ months.

* Equal payments being at 3 and 6 months, the mean is 4½ months; at 3, 4, *and 6 months*, the mean is 4⅓ months, &c.

4. The sales of a consignment of goods became due, viz.

| | |
|---|---|
| $267 | on the 1st of March. |
| 216 | 10th of May. |
| 135 | 4th of July. |
| 162 | 16th of August. |

Required the equated, or mean time of payment.

| | | |
|---|---|---|
| 267 | due at present, or the first payment. | |
| 216×70 | days - - - | 15120 |
| 135×125 | - - - | 16875 |
| 162×168 | - - - | 27216 |
| 780 | | 780)59211 |

Ans. 76 days from the 1st of March, which is the 16th of May—or thus,

| | | |
|---|---|---|
| March 1, | $267×70 - - | 18690 |
| May 10, | 216 | |
| | 483×55 - - | 26565 |
| July 4, | 135 | |
| | 618×43 - - | 26574 |
| Aug. 16, | 162 | |
| | 780 | 780)71829 |

Ans. 92 days previous to the 16th of August, which gives the mean time, May 16th as before.

If the times of payment be not in regular succession, they should be so placed previous to the calculation; noting the first or earliest time of payment, and then taking the others as they become due.

When there are *Drs.* and *Crs.* to an account, and the equated time of paying the balance is required, some persons find the products of each, in the usual manner of time and money, and divide the balance of products by the balance of moneys for the time required.

But the general method in such case, especially in accounts between British and American merchants, is to adjust by an interest account, and in this way, show the balance at the time of furnishing the account current.

## BARTER.

BARTER is the exchanging of one commodity for another on such terms as may be agreed on.

EXAMPLES.

1. How many quintals of fish, at $2 per quintal, will pay for 140 hhds. of salt, at $4,70 per hhd.? Ans. 329.

2. A. buys of B. 4 hhds. of rum, containing 410 gallons, at $1,17 per gallon; and 253 lb. of coffee, at 21 cts. per lb. in part of which he pays $21 in cash, and the balance in boards, at $4 per thousand; how many feet of boards did the balance require? Ans. 127957½ feet.

3. A. buys of B. 178 quintals of fish, at 25*s.* N. E. per quintal, also 72 quintals at 15*s.* 6*d.* and 20 bbls. of No. 1 mackerel, at $5,70. In payment B. takes $100 in cash, 179 gallons of molasses, at 3*s.* 8*d.* 120 gallons of wine at 7*s.* 6*d.* and gives 3 months credit for the remainder; but for accommodation, A. pays the balance in cash, on being allowed interest for the time at 6 per cent. per annum as discount. Required the discount and balance, and a mercantile statement.

| *B.* | | *Cr.* |
|---|---|---|
| By 178 quintals Fish - - | at 25*s.* N. E. | $741,66 |
| By 72 " " - - | 15*s.* 6*d.* | 186,00 |
| By 20 bbls. No. 1 Mackerel | $5,70 | 114,00 |
| | | $1041,66 |

| *Dr.* | | |
|---|---|---|
| To Cash - - - - - | $100,00 | |
| To 179 gallons Molasses - | at 3*s.* 8*d.* 109,39 | |
| To 120 " Wine - - | 7*s.* 6*d.* 150,00 | |
| To *Discount* allowed - - - | 10,23 | |
| To Cash for *balance* - - - | 672,04 | |
| | | $1041,66 |

4. B. has C.'s note for 250 dols. with 6 months interest due on it, and to redeem it, C. delivers him 60 bushels of wheat at 1 dol. 25 cts. per bushel, 50 bushels of corn at 87½ cts. per bushel, and the balance in staves at 30 dols. per thousand; what number of staves did B. receive?

Ans. 5550 staves, or 4 m. 6 hun. and 10 casts.

5. C. has nutmegs worth 7*s*. 6*d*. per lb. in ready money, but in barter he will have 8*s*. ; D. has tobacco worth 9*d*. per lb.; how much must he rate it per lb. that his profit may be equal to C.'s? Ans. $9\frac{3}{5}d$.

6. A. has tea which he barters with B. at 10*d*. per lb. more than it cost him, against cambric which stands B. in 10*s*. per yard, but he puts it at 12*s*. 6*d*.; I would know the first cost of the tea? Ans. 3*s*. 4*d*. per lb.

7. A. has 240 bushels of rye, which cost him 90 cts. per bushel ; this he barters with B. at 95 cts. for wheat that stands B. in 99 cts. per bushel ; how many bushels of wheat is he to receive in barter, and at what price is it to be rated, that their gains may be equal?

Ans. $218\frac{38}{209}$ bushels, at $104\frac{1}{2}$ cts. per bushel.

8. A. and B. barter some goods—A. put his at $30\frac{6}{25}$ shillings, and gains 8 per cent.; B. puts his at $24\frac{3}{10}$ shillings, and gains at the same rate ; what was the first cost of the goods? Ans. 28*s*. and 22*s*. 6*d*.

9. A. and B. barter—A. has cloth that cost 28*d*. B.'s cost him 22*d*. and he puts it at 25*d*.; how high must A. put his to gain 10 per cent. more than B.? Ans. 35*d*.

10. C. and D. barter—C. makes of 7*s*., 6*s*. 8*d*.; D. makes of 7*s*. 6*d*., 7*s*. 3*d*.; who has lost most, and by how much per cent.? Ans. C. loses $1\frac{3}{4}$ per cent. more than D

## LOSS AND GAIN

Is a rule that discovers what is gained or lost in buying or selling goods, and instructs merchants and traders to raise or fall the price of their goods so as to gain or lose so much per cent. &c.

EXAMPLES.

1. Bought a piece of broadcloth containing 53 yards, at 4 dols. 65 cents per yard, and sold at 5 dols. per yard ; what is the profit on the whole?

$$\begin{array}{l} \$5{,}00 \\ \quad 4{,}65 \\ \hline \text{If } \overset{\text{yd.}}{1} : {,}35 :: \overset{\text{yds.}}{53} \\ \quad\quad\quad {,}35 \\ \hline \quad\quad 265 \\ \quad\quad 159 \\ \hline \quad 18{,}55 \end{array}$$

Ans. $18,55.

2. If 1 lb. of coffee cost 28 cts. and is sold for 31 cents, what is the profit on 3 bags, weighing 293 lbs. net?
Ans. 8 dols. 79 cts.

3. Bought a piece of baize of 42 yds. for £4 14 6, and sold it for 2*s*. 6*d*. per yard: what is the gain or loss on the whole piece? Ans. 10*s*. 6*d*. gain.

4. A merchant bought 59 cwt. 3 qrs. 14 lbs. of iron, at 112 dols. per ton, paid freight and charges, 24 dols.: what is the gain or loss, if he sells the whole at 37*s*. 4*d*. per cwt.
Ans. 13 dols. 26 cts. gain.

5. If a gallon of wine cost 6*s*. 8*d*. and is sold for 7*s*. 2*d*. what is the gain per cent.?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | 7 | 2 | | | |
| | | | 6 | 8 | | | |
| *s.* | *d.* | | | | *£* | | |
| If 6 | 8 | : | 6 | :: | 100 | Ans. 7½ per cent. gain. | |

6. When 20 per cent. loss is made on coffee, sold at 20 cts. per lb. what was the first cost? Ans. 25 cents.

7. At 13½ cts. profit on the dollar, how much is it per ct.?
Ans. 13½ per ct. or 13 dols. 50 cts. per 100 dols.

8. A trader sells his goods at 2½*d*. profit on the shilling, how much is it per cent.? Ans. 20¾, or £20 16 8.

9. Which is the better bargain, in purchasing fish, 17*s*. per quintal, and 4 months credit, or 16*s*. 8*d*. cash?
Ans. They are alike.

PROOF. The present worth of 17*s*. found by discount, is equal to 16*s*. 8*d*.; and 16*s*. 8*d*. with 4 months interest, will amount to 17*s*.

10. A. bought a piece of shalloon, containing 34 yards, at 3*s*. 4*d*. per yard, and sold it at 12½ per cent. loss: how much did he sell it per yard? Ans. 2*s*. 11*d*.

11. Bought wine at 90 cts. per gallon: at what rate must it be sold to gain 20 per cent.? Ans. $1,08.

12. A trader bought 1 hhd. of brandy, of a certain proof, containing 115 gallons. at $1,10 per gallon: how many gallons of water must he put into it to gain $5, by selling it at $1 per gallon? Ans. 16½ gals.

13. Bought 4 hhds. of wine, containing 450 gallons at $1 per gallon, and sold it at $1,20 per gallon, and gave 3 months credit: allowing the leakage of the wine, while in my possession, to be 10 gallons, I would know the gain or loss, discounting for the present worth of the debt at 6 per cent. per annum? Ans. $70,19 gain.

14. A vinter buys 596 gallons of wine, at 6*s*. 3*d*. per gallon, in ready money, and sells it immediately at 6*s*. 9*d*. per gallon, payable in 3 months: how much is his gain or loss, supposing he allows the interest for the time, at 6 per cent. per annum, as discount for present payment?

Ans. £11 17*s*. 8*d*. gained.

15. What would be the gain or loss on the aforesaid wine, supposing the discount for present payment to be made at 2 per cent. without any regard to time?

Ans. £10 17 6½ gain.

16. A merchant bought a parcel of cloth, at the rate of $1 for every 2 yards, of which he sold a certain quantity at the rate of $3 for every 5 yards, and then found he had gained as much as 18 yards cost: how many yards did he sell?

Ans. 90 yards.

17. Bought rum at $1,25 per gallon, which not proving so good as I expected, I am content to lose 18 per cent. by it: how must I sell it per gallon? Ans. $1,02½.

18. A. sells a quantity of corn at $1 a bushel, and gains 20 per cent.; some time after he sold of the same, to the amount of $37,50, and gained 50 per cent.: how many bushels were there in the last parcel, and at what rate did he sell it per bushel?

Ans. 30 bushels, at $1,25 per bushel.

19. A distiller is about purchasing 10,000 gallons of molasses, which he can have at 48 cents per gallon in ready money, or 50 cents with 2 months credit: it is required to know which is more advantageous to him, either to buy it on credit, or to borrow the money at 8 per cent. per annum to pay the cash price?

Ans. He will gain $136 by paying the cash.

20. A tobacconist buys 4 hhds. of tobacco, weighing 38 cwt. 2 qrs. 8 lb. gross, tare 94 lb. per hhd. at $9 per cwt. ready money, and sells it at 11½*d*. per lb. allowing tare at 14 lb. per cwt; to receive two thirds in cash, and for the remainder a note at 90 days credit: his gain or loss is required, supposing the interest for the time at 6 per cent. per 360 days is allowed for discount, on turning the note into cash? Ans. $283,80 gain.

## ALLIGATION MEDIAL.

ALLIGATION MEDIAL is when the quantities and prices of several things are given, to find the mean price of the mixture compounded of those things.

RULE. As the sum of the quantities or whole composition is to their total value, so is any part of the composition to its mean price.

EXAMPLES.

1. A grocer would mix 25 lb. of raisins, at 8 cts. per lb., and 35 lb. at 10 cts. per lb., with 40 lb. at 12 cts. per lb.: what is 1 lb. of this mixture worth ?

| *lb.* | | *cts.* | | *cts.* |
|---|---|---|---|---|
| 25 | at | 8 | - | 200 |
| 35 | - | 10 | - | 350 |
| 40 | - | 12 | - | 480 |
| 100 | | | | 1030 |

| | *lb.* | | *cts.* | | *lb.* |
|---|---|---|---|---|---|
| If | 100 | : | 1030 | : : | 1 |
| | | | 1 | | |

1|00)10|30

*cts.* 10,3 Ans. 10 cts. 3 mills.

2. A goldsmith mixes 8 lb. $5\frac{1}{2}$ oz. of gold, of 14 carats fine, with 12 lb. $8\frac{1}{2}$ oz. of 18 carats fine : what is the fineness of this mixture ? Ans. $16\frac{5}{17}$ carats.

3. A grocer would mix 12 cwt. of sugar, at $\$10$ per cwt. with 3 cwt. at $\$8\frac{3}{4}$ per cwt., and 8 cwt. at $\$7\frac{1}{2}$ per cwt. : what will 5 cwt. of this mixture be worth ?

Ans. $\$44$ 78 cts. 2 ms.

4. A refiner melts $2\frac{1}{2}$ lb. of gold, of 20 carats fine, with 4 lb. of 18 carats fine : how much alloy must be put to it to make it 22 carats fine ?

Ans. It is not fine enough by $3\frac{3}{13}$ carats, so that no alloy must be put to it, but more gold.

5. A maltster mingles 30 quarters of brown malt, at 28*s.* per quarter, with 46 quarters of pale, at 30*s.* per quarter, and 24 quarters of high-dried do. at 25*s.* per quarter : what is the value of 8 bushels of this mixture ?

Ans. £1 8*s.* $2\frac{1}{2}d.\frac{3}{4}$.

6. If I mix 27 bushels of wheat, at 5*s.* 6*d.* the bushel, with the same quantity of rye, at 4*s.* per bushel, and 14 bushels of barley at 2*s.* 8*d.* per bushel : what is the worth of a bushel of the mixture ? Ans. 4*s.* $3\frac{3}{4}d.\frac{2}{8}\frac{3}{8}$.

7. A grocer mingled 3 cwt. of sugar, at 56*s.* per cwt., 6 cwt. at £1 17 4 per cwt., and 3 cwt. at £3 14 8 per cwt. : what is 1 cwt. of this mixture worth ? Ans. £2 11 4.

8. A mealman has flour of several sorts, and would mix 3 bushels at 3*s.* 5*d.* per bushel, 4 bushels at 5*s.* 6*d.* per bushel, and 5 bushels at 4*s.* 8*d.* per bushel : what is the worth of a bushel of this mixture ? Ans. 4*s.* $7\frac{1}{2}d.\frac{4}{12}$.

9. A vintner mixes 20 gallons of Port, at 5*s.* 4*d.* per gallon, with 12 gallons of white wine, at 5*s.* per gallon, 30 gallons of Lisbon, at 6*s.* per gallon, and 20 gallons of Mountain, at 4*s.* 6*d* per gallon : what is a gallon of this mixture worth ?
Ans. 5*s.* $3\frac{3}{4}d.\frac{5}{8}\frac{9}{2}$.

10. A farmer mingled 20 bushels of wheat, at 5*s.* per bushel, and 36 bushels of rye, at 3*s.* per bushel, with 40 bushels of barley, at 2*s.* per bushel : I desire to know the worth of a bushel of this mixture ? Ans. 3*s.*

11. A person mixing a quantity of oats, at 2*s.* 6*d.* per bushel, with the like quantity of beans, at 4*s.* 6*d.* per bushel, would be glad to know the value of 1 bushel of that mixture ?
Ans. 3*s.* 6*d.*

12. A refiner, having 12 lb. of silver bullion of 6 oz. fine, would melt it with 8 lb. of 7 oz. fine, and 10 lb. of 8 oz. fine : required the fineness of 1 lb. of that mixture ?
Ans. 6 oz. 18 dwt. 16 grs.

13. If with 40 bushels of corn, at 4*s.* per bushel, there are mixed 10 bushels, at 6*s.* per bushel, 30 bushels at 5*s.* per bushel, and 20 bushels, at 3*s.* per bushel : what will 10 bushels of that mixture be worth ? Ans. £2 3.

## ALLIGATION ALTERNATE.

ALLIGATION ALTERNATE is the method of finding what quantity of any number of simples, whose rates are given, will compose a mixture of a given rate : so that it is the reverse of Alligation Medial, and may be proved by it.

RULE. 1. Write the rates of the simples in a column under each other.

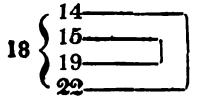
2. Connect or link with a continued line the rate of each simple, which is less than that of the compound, with one or any number, of those that are greater than the compound, and each greater rate with one or any number of the less.

3. Write the difference between the mixture rate and the rate of each of the simples, opposite the rates with which they are linked.

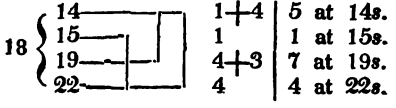
4. Then if only one difference stand against any rate, it will be the quantity belonging to that rate; but if there be several, their sum will be the quantity.

EXAMPLES.

1. A merchant would mix wines at 14*s*. 19*s*. 15*s*. and 22*s*. per gallon, so that the mixture may be worth 18*s*. the gallon: what quantity of each must be taken?




Or thus,




NOTE. Questions in this rule admit of a great variety of answers, according to the manner of linking them.

2. How much wine at 6*s*. per gallon, and at 4*s*. per gallon, must be mixed together, that the composition may be worth 5*s*. per gallon? Ans. 1 qt. or 1 gal. of each, &c.

3. How much corn, at 2*s*. 6*d*., 3*s*. 8*d*., 4*s*., and 4*s*. 8*d*. per bushel, must be mixed together, that the compound may be worth 3*s*. 10*d*. per bushel?

Ans. 12 at 2*s*. 6*d*., 12 at 3*s*. 8*d*., 18 at 4*s*., and 18 at 4*s*. 8*d*.

4. A goldsmith has gold of 17, 18, 22, and 24 carats fine; how much must he take of each to make it 21 carats fine?

Ans. 3 of 17, 1 of 18, 3 of 22, and 4 of 24.

5. It is required to mix brandy at 8*s*., wine at 7*s*., cider at 1*s*., and water, together, so that the mixture may be worth 5*s*. per. gallon?

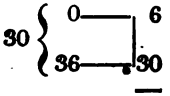
Ans. 9 gals. brandy, 9 of wine, 5 of cider, and 5 of water.

*When the whole composition is limited to a certain quantity.*

RULE. Find an answer, as before, by linking; then say, As the sum of the quantities, or differences, thus determined, is to the given quantity, so is each ingredient found by linking, to the required quantity of each.

EXAMPLES.

6. How many gallons of water must be mixed with wine worth 3*s.* per gallon, so as to fill a vessel of 100 gallons, and that a gallon may be afforded at 2*s.* 6*d.*?




36 : 100 :: 6 : 36

6

36)600(16
36

240
216

24

36 : 100 :: 30 : 36

30

36)3000(83
288

120
108

12

Ans. 83⅓ gals. of wine, and 16⅔ of water.

7. A grocer has currants at 4*d.*, 6*d.*, 9*d.* and 11*d.* per lb. and he would make a mixture of 240 lbs. so that it might be afforded at 8*d.* per lb.: how much of each sort must he take?

Ans. 72 lbs. at 4*d.*, 24 at 6*d.*, 48 at 9*d* and 96 at 11*d.*

8. How much gold of 15, of 17, of 18 and of 22 carats fine, must be mixed together to form a composition of 40 oz. of 20 carats fine?

Ans. 5 oz. of 15, of 17 and of 18, and 25 oz. of 22.

*When one of the ingredients is limited to a certain quantity.*

RULE. Take the difference between each price and the mean rate, as before; then,

As the difference of that simple, whose quantity is given, is to the rest of the differences severally, so is the quantity given to the several quantities required.

EXAMPLES.

9. How much wine, at 5*s*., at 5*s*. 6*d*., and at 6*s*. the gal. must be mixed with 3 gallons, at 4*s*. per gallon, so that the mixture may be worth 5*s*. 4*d*. the gallon?

10 : 10 :: 3 : 3
10 : 20 :: 3 : 6
10 : 20 :: 3 : 6

Ans. 3 gals. at 5*s*., 6 at 5*s*. 6*d*., and 6 at 6*s*.

10. A grocer would mix teas at 12*s*., 10*s*., and 6*s*., with 20 lbs. at 4*s*. per lb.: how much of each sort must he take to make the composition worth 8*s*. per lb.?

Ans. 20 lbs. at 4*s*., 10 at 6*s*., 10 at 10*s*., and 20 at 12*s*.

11. How much gold of 15, of 17, and of 22 carats fine, must be mixed with 5 oz. of 18 carats fine, so that the composition may be 20 carats fine?

Ans. 5 oz. of 15 carats fine, 5 oz. of 17, and 25 of 22.

## POSITION

Is a rule which, by false or supposed numbers, taken at pleasure, discovers the true one required. It is divided into two parts; SINGLE and DOUBLE.

### *SINGLE POSITION*

Is by using one supposed number, and by working with it as the true one, you find the real number required, by the following

RULE. As the total of the errors is to the given sum, so is the supposed number to the true one required.

PROOF. Add the several parts of the result together, and if it agrees with the given sum it is right.

EXAMPLES.

1. A schoolmaster, being asked how many scholars he had, said, If I had as many, half as many, and one quarter as many more, I should have 264: how many had he?

Suppose he had 72
As many 72
½ as many 36
¼ as many 18

As 198 : 264 :: 72
72

528
1848

198)19008(96 answer.
1782

1188
1188

Proof.
96
96
48
24

264

2. A person, after spending ⅓ and ¼ of his money, had 60 dollars left; what had he at first? Ans. 144 dols.

3. A certain sum of money is to be divided between 4 persons, in such a manner, that the first have ½ of it, the second ¼, the third ⅛, and the fourth the remainder, which is $28; what was the sum? Ans. 112 dols.

4. A person lent his friend a sum of money unknown, to receive interest for the same, at 6 per cent. per annum, simple interest, and at the end of 5 years he received for principal and interest 644 dollars 80 cents; what was the sum lent? Ans. 496 dols.

## *DOUBLE POSITION*

Is by making use of two supposed numbers, which, if both prove false, are, with their errors, to be thus disposed:

Rule. 1. Place each error against its respective position.

2. Multiply them crosswise.

3. If the errors are alike, that is, both greater or both less than the given number, divide the difference of the products by the difference of the errors, and the quotient is the answer; but if the errors be unlike, divide the sum of the products by the sum of the errors, and the quotient will be the answer.

### Examples.

1. B. asked C. how much his horse cost; C. answered, that if he cost him three times as much as he did, and $15

more, he would stand him in $300 : what was the price of the horse?

Suppose he cost $90 — Suppose he cost $96

| | |
|---|---|
| 3 | 3 |
| 270 | 288 |
| 15 | 15 |
| 285 too little by $15. | 303 too much by 3. |

90 15

X

96 3+

| | | |
|---|---|---|
| 15 | 1440 | 270 |
| 3 | 270 | |

Sum of the errors 18) 1710(95 answer.

162

90

90

95

3

285

15

300 proof.

2. Two persons, A. and B., have both the same income; A. saves one-fifth of his yearly ; but B., by spending $150 per annum more than A., at the end of 8 years finds himself 400 dollars in debt ; what is their income, and what does each spend per annum?

Ans. Their income is $500 per annum ; also A. spends $400, and B. $550 per annum.

3. There is a fish whose head is 9 inches long, and his tail is as long as his head and half his body, and his body is as long as his head and tail· what is the whole length of the fish? Ans. 6 feet.

## PROGRESSION

Consists in two Parts—ARITHMETICAL and GEOMETRICAL

### *ARITHMETICAL PROGRESSION*

Is when a rank of numbers increase or decrease regularly by the continual adding or subtracting of some equal num

ber: As 1, 2, 3, 4, 5, 6, are in Arithmetical Progression by the continual increasing or adding of one; and 11, 9, 7, 5, 3, 1, by the continual decrease or subtraction of two.

NOTE. When any even number of terms differ by Arithmetical Progression, the sum of the two extremes will be equal to the two middle numbers, or any two means equally distant from the extremes: As, 2, 4, 6, 8, 10, 12, where $6+8$, the two middle numbers, are $= 12 + 2$, the two extremes, and $= 10 + 4$, the two means $= 14$.

When the number of terms are odd, the double of the middle term will be equal to the two extremes, or of any two means equally distant from the middle term: As, 1, 2, 3, 4, 5, where the double of $3 = 5 + 1 = 2 + 4 = 6$.

In Arithmetical Progression five things are to be observed, viz.

1. The first term.
2. The last term.
3. The number of terms.
4. The equal difference.
5. The sum of all the terms.

Any three of which being given, the other two may be found.

*The first, second, and third terms given, to find the fifth.*

RULE. Multiply the sum of the two extremes by half the number of terms, or multiply half the sum of the two extremes by the whole number of terms, the product is the total of all the terms.

EXAMPLES.

1. How many strokes does the hammer of a clock strike in 12 hours?

$12 + 1 = 13$ *then* $13 \times 6 = 78$. Ans.

2. A man buys 17 yards of cloth, and gave for the first yard 2*s*. and for the last 10*s*. what did the 17 yards amount to? Ans. £5 2*s*.

3. If 100 eggs were placed in a right line, exactly a yard asunder from one another, and the first a yard from a basket, what length of ground does that man travel who gathers up these 100 eggs singly, returning with every egg to the basket to put it in? Ans. 5 miles, 1300 yards.

*The first, second, and third terms given, to find the fourth.*

RULE. From the second subtract the first, the remainder divided by the third, less one, gives the fourth

EXAMPLES.

1. A man had 8 sons, the youngest was 4 years old, and the eldest 32, the increase in Arithmetical Progression: what was the common difference of their ages? Ans. 4.

32—4=28 then 28÷3—1=4 the common difference.

2. A man is to travel from Boston to a certain place in 12 days, and to go but 3 miles the first day, increasing every day by an equal excess, so that the last day's journey may be 58 miles: what is the daily increase, and how many miles distant is that place from Boston?

Ans. 5 miles daily increase.

Therefore as 3 miles is the first day's journey

3 + 5 = 8 second ditto.

8 + 5 = 13 third ditto, &c.

The whole distance is 366 miles.

*The first, second, and fourth terms given, to find the third.*

RULE. From the second subtract the first, the remainder divide by the fourth, and to the quotient add 1, gives the third.

EXAMPLES.

1. A person travelling into the country, went 3 miles the first day, and increased every day by 5 miles, till at last he went 58 miles in one day: how many days did he travel?

Ans. 12.

58—3=55 then 55÷5=11 and 11+1=12 the number of days.

2. A man being asked how many sons he had, said that the youngest was 4 years old, and the eldest 32, and that he increased one in his family every 4 years, how many had he?

Ans. 8.

*The second, third, and fourth given, to find the first.*

RULE. Multiply the fourth by the third, made less by 1, the product subtracted from the second gives the first.

EXAMPLES.

1. A man in 10 days went from Boston to a certain town in the country, every day's journey increasing the former by 4, and the last day he went was 46 miles: what was the first?

Ans. 10 miles.

4×10—1=36 then 46—36=10, the first day's journey.

2. A man takes out of his pocket at 8 several times, so many different numbers of shillings, every one exceeding the former by 6; the last 46: what was the first? Ans. 4.

*The second, third, and fifth given, to find the first.*

RULE. Divide the fifth by the third, and from the quotient subtract half the product of the fourth, multiplied by the third less 1, gives the first.

EXAMPLE.

A man is to receive £360 at 12 several payments, each to exceed the former by £4, and is willing to bestow the first payment on any one that can tell him what it is: what will that person have for his pains? Ans. £8.

$360 \div 12 = 30$ then $30 - \frac{4 \times 12 - 1}{2} = 8$ the first payment.

*The first, third, and fourth given, to find the second.*

RULE. Subtract the fourth from the product of the third, multiplied by the fourth; that remainder, added to the first, gives the second.

EXAMPLE.

What is the last number of an Arithmetical Progression, beginning at 6, and continuing by the increase of 8 to 20 places: Ans. 158.

$20 \times 8 - 8 = 152$ then $152 + 6 = 158$, the last number

## *GEOMETRICAL PROGRESSION*

Is the increasing or decreasing of any rank of numbers by some common ratio, that is, by the continual multiplication or division of some equal number: As 2, 4, 8, 16, increase by the multiplier 2, and 16, 8, 4, 2, decrease by the divisor 2.

NOTE. When any number of terms is continued in Geometrical Progression, the product of the two extremes will be equal to any two means, equally distant from the extremes: As 2, 4, 8, 16, 32, 64, where $64 \times 2 = 4 \times 32 = 8 \times 16 = 128$.

When the number of terms are odd, the middle term multiplied into itself will be equal to the two extremes, or any two means, equally distant from the mean: As 2, 4, 8, 16, 32, where $2 \times 32 = 4 \times 16 = 8 \times 8 = 64$.

In Geometrical Progression the same five things are to be observed, as in Arithmetical, viz.

1. The first term.
2. The last term.
3. The number of terms.
4. The equal difference or ratio.
5. The sum of all the terms.

NOTE. As the last term in a long series of numbers, is very tedious to come at, by continual multiplication; therefore, for the readier finding it out, there is a series of numbers, made use of in Arithmetical Proportion, called indices, beginning with an unit, whose common difference is one; whatever number of indices you make use of, set as many numbers (in such Geometrical Proportion as is given in the question,) under them:

As 1, 2, 3, 4, 5, 6 indices.
2, 4, 8, 16, 32, 64 numbers in Geometrical Proportion.

But if the first term in Geometrical Proportion be different from the ratio, the indices must begin with a cipher:

As 0, 1, 2, 3, 4, 5, 6 indices.
1, 2, 4, 8, 16, 32, 64 numbers in Geometrical Proportion.

When the indices begin with a cipher, the sum of the indices made choice of must be always one less than the number of terms given in the question, for 1 in the indices is over the second term, and 2 over the third, &c.

Add any two of the indices together, and that sum will agree with the product of their respective terms.

| | |
|---|---|
| As in the first table of indices | 2 + 5 = 7 |
| Geometrical Proportion | 4 × 32 = 128 |
| Then in the second, | 2 + 4 = 6 |
| | 4 × 16 = 64 |

*In any Geometrical Progression proceeding from unity, the ratio being known, to find any remote term, without producing all the intermediate terms.*

RULE. Find what figures of the indices, added together, would give the exponent of the term wanted, then multiply the numbers standing under such exponent into each other, and it will give the term required.

NOTE. When the exponent 1 stands over the second term, the number of exponents must be one less than the number of terms.

## EXAMPLES.

1. A man agrees for 12 peaches, to pay only the price of the last, reckoning a farthing for the first, a half-penny for the second, &c. doubling the price to the last: what must he pay for them?

0, 1, 2, 3, 4, exponents.
1, 2, 4, 8, 16, number of terms.

4+4+3=11, number of terms less 1.

16=4
16=4
256=8
8=3
4)2048=11 numb. far.
12)512
20)42 8

Ans. £2 2s. 8d.

2. A country gentleman, going to a fair to buy some oxen, meets with a person who had 23, he demanding the price of them, was answered £16 apiece; the gentleman bids him £15 apiece, and he would buy all; the other tells him it would not be taken, but if he would give what the last ox would come to, at a farthing for the first, and doubling it to the last, he should have all. What was the price of the oxen? Ans. £4369 1s. 4d.

*In any Geometrical Progression, not proceeding from unity, the ratio being given, to find any remote term, without producing all the intermediate terms.*

RULE. Proceed as in the last, only observe that every product must be divided by the first term.

EXAMPLES.

1. A sum of money is to be divided among eight persons, the first to have £20, the second £60, and so on in triple proportion, what will the last have?

0. 1. 2. 3. $\frac{540\times540}{20}=14580$ then $\frac{14580\times60}{20}=43740$
20. 60. 180. 540.

Ans. £43740.

3+3+1=7 one less than the number of terms.

2. A gentleman dying, left 9 sons, to whom and to his executor, he bequeathed his estate in manner following: To his executor £50; his youngest son was to have as much more as the executor, and each son to exceed the next younger by as much more; what was the eldest son's portion? Ans. £25600.

*The first term, ratio, and number of terms given, to find the sum of all the terms.*

RULE. Find the last term as before, then subtract the first from it, and divide the remainder by the ratio less one, to the quotient of which add the greater, and it gives the sum required.

EXAMPLES.

1. A servant skilled in numbers agreed with a gentleman to serve him 12 months, provided he would give him a farthing for his first month's services, a penny for the second, and 4*d.* for the third, &c.—what did his wages amount to?

256×256=65536, then 65536×64=4194304

0. 1. 2. 3. 4. 4194304—1

1. 4. 16. 64. 256. ———=1398101 ; then

(4+4+3=11. No. of terms less 1.) 4—1

1398101+4194304=5592405 farthings.

Ans. £5825 8*s.* 5¼*d.*

2. A man bought a horse, and by agreement was to give a farthing for the first nail, three for the second, &c. ; there were 4 shoes, and in each shoe 8 nails: what was the worth of the horse? Ans. £965114681693 13*s.* 4*d.*

3. A certain person married his daughter on new-year's day, and gave her husband one shilling towards her portion, promising to double it on the first day of every month for one year ; what was her portion? Ans. £204 15*s.*

## PERMUTATION

Is the changing or varying of the order of things.

RULE. Multiply all the given terms into one another, and the last product will be the number of changes required.

EXAMPLES.

1. How many changes may be rung upon 12 bells, and how long would they be ringing but once over, supposing 10 changes might be rung in one minute, and the year to contain 365 days 6 hours?

1×2×3×4×5×6×7×8×9×10×11×12=479001600 changes, which÷10=47900160 minutes, and if reduced is =91 years, 3 weeks, 5 days and 6 hours.

2. A young scholar coming into a town for the conveniency of a good library, demands of a gentleman with whom he

lodged, what his diet would cost for a year, who told him £10; but the scholar not being certain what time he should stay, asked him what he must give him for so long as he could place his family (consisting of 6 persons besides himself) in different positions, every day at dinner; the gentleman, thinking it could not be long, tells him £5, to which the scholar agrees: what time did the scholar stay with the gentleman? Ans. 5040 days.

## EXTRACTION OF THE SQUARE ROOT.

EXTRACTION OF THE SQUARE ROOT is to find out such a number as being multiplied into itself, the product will be equal to the given number.

RULE. 1. Point the given number, beginning at the unit's place, then to the hundreds', and so upon every second figure throughout.

2. Seek the greatest square number in the first point, towards the left hand, placing the square number under the first point, and the root thereof in the quotient; subtract the square number from the first point, and to the remainder bring down the next point, and call that the resolvend.

3. Double the quotient, and place it for a divisor on the left hand of the resolvend; seek how often the divisor is contained in the resolvend (reserving always the unit's place) and put the answer in the quotient, and also on the right hand side of the divisor; then multiply by the figure last put in the quotient, and subtract the product from the resolvend; bring down the next point to the remainder (if there be any more) and proceed as before.

| Roots. | 1. | 2. | 3. | 4 | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|---|---|---|---|
| Squares. | 1. | 4. | 9. | 16 | 25. | 36. | 49. | 64. | 81. |

EXAMPLES.

1 What is the square root of 119025?

```
 119025(345
   9
64)290
   256
685)3425
   3425
```

Ans. 345.

2. What is the square root of 106929? Ans. 327.
3. What is the square root of 2268741? Ans. 1506,23+

When the given number consists of a whole number and decimals together, make the number of decimals even, by adding ciphers to them, so that there may be a point fall on the unit's place of the whole number.

4. What is the square root of 3271,4007? Ans. 57,19+
5. What is the square root of 4795,2571? Ans. 69,247+

*To extract the square root of a vulgar fraction.*

RULE. Reduce the fraction to its lowest terms, then extract the square root of the numerator for a new numerator, and the square root of the denominator for a new denominator.

If the fraction be a surd, (i. e.) a number whose root can never be exactly found, reduce it to a decimal, and extract the root from it.

EXAMPLES.

6. What is the square root of $\frac{2304}{5184}$? Ans. $\frac{8}{9}$.

SURD.

7. What is the square root of $\frac{176}{441}$? Ans. ,89802+

*To extract the square root of a mixed number.*

RULE. 1. Reduce the fractional part of a mixed number to its lowest term, and then the mixed number to an improper fraction.

2. Extract the roots of the numerator and denominator for a new numerator and denominator.

If the mixed number given be a surd, reduce the fractional part to a decimal, annex it to the whole number, and extract the square root therefrom.

EXAMPLES.

8. What is the square root of $51\frac{21}{25}$? Ans. $7\frac{1}{5}$.
9. What is the square root of $27\frac{9}{16}$? Ans. $5\frac{1}{4}$.

SURDS.

10. What is the square root of $85\frac{14}{15}$? Ans. 9,27+
11. What is the square root of $8\frac{5}{7}$? Ans. 2,9519+

THE APPLICATION.

1. There is an army consisting of a certain number of men, who are placed rank and file, that is, in the form of a square, each side having 576 men, I desire to know how many the whole square contains? Ans. 331776.

2. A certain pavement is made exactly square, each side of which contains 97 feet, I demand how many square feet are contained therein? Ans. 9409.

*To find a mean proportional between any two given numbers.*

RULE. The square root of the product of the given number is the mean proportional sought.

1. What is the mean proportional between 3 and 12?

Ans. $3 \times 12 = 36$ then $\sqrt{36} = 6$ the mean proportional.

2. What is the mean proportional between 4276 and 842?

Ans. 1897,4+

*To find the side of a square equal in area to any given superfices.*

RULE. The square root of the content of any given superfices, is the equal square sought.

EXAMPLES.

1. If the content of a given circle be 160, what is the side of the square equal? Ans. 12,64911.

2. If the area of a circle is 750, what is the side of the square equal? Ans. 27,38612.

*The area of a circle given, to find the diameter.*

RULE. As 355 : 452, or as 1 : 1,273239 : : so is the area: to the square of the diameter;—or, multiply the square root of the area by 1,12837, and the product will be the diameter.

EXAMPLE.

What length of cord will fit to tie to a cow's tail, the other end fixed in the ground, to let her have liberty of eating an acre of grass, and no more, supposing the cow and tail to be 5 yards and a half? Ans. 6,136 perches.

*The area of a circle given, to find the periphery or circumference.*

RULE. As 113 : 1420, or as 1 : 12,56637 : : the area: to the square of the periphery, or multiply the square root of the area by 3,5449, and the product is the circumference.

EXAMPLES.

1. When the area is 12, what is the circumference?

Ans. 12,2798.

2. When the area is 160, what is the periphery?

Ans. 44,84.

*Any two sides of a right angled triangle given, to find the third side.*

The base and perpendicular given, to find the hypotenuse.

RULE. The square root of the sum of the squares of the base and perpendicular is the length of the hypotenuse.

EXAMPLES.

1. The top of a castle from the ground is 45 yards high, and is surrounded with a ditch 60 yards broad; what length must a ladder be to reach from the outside of the ditch to the top of the castle? Ans. 75 yards.

2. The wall of a town is 25 feet high, which is surrounded by a moat of 30 feet in breadth, I desire to know the length of a ladder that will reach from the outside of the moat to the top of the wall. Ans. 39,05 feet.

*The hypotenuse and perpendicular given, to find the base.*

RULE. The square root of the difference of the squares of the hypotenuse and perpendicular is the length of the base.

*The base and hypotenuse given, to find the perpendicular.*

RULE. The square root of the difference of the squares of the hypotenuse and base is the height of the perpendicular.

N. B. The two last questions may be varied for examples to the two last propositions.

*Any number of men being given, to form them into a square battle, or to find the number of ranks and files.*

RULE. The square root of the number of men given, is the number of men either in rank or file.

EXAMPLES.

1. An army consists of 331776 men, I desire to know how many in rank and file? Ans. 576.

2. A certain square pavement contains 48841 square stones, all of the same size, I demand how many are contained in one of the sides? Ans. 221.

*To find the area of a piece of land in form of a triangle.*

RULE. Add together the three sides, from half their sum subtract each side, and note the remainder, then multiply the half sum by one of those remainders, and that product by another remainder; the square root of the last product will be the area.

EXAMPLE.

Suppose a triangular piece of land, whose sides are 24, 16, d 12 rods; what is the area?

24+16+12=52÷2=26 for half.

26—24= 2 then 26×2×10×14=7280, the square

26—16=10 root of which is 85,32+ rods.

26—12=14

Multiplying the longest side by half of the nearest dis- ıce, to its opposite angle; or, multiplying the longest side the nearest distance to its opposite angle and taking half the product, gives the area.

EXAMPLE.

If the three sides of a piece of land in form of a triangle 15, 14, and 13 rods, required the area?

ıe nearest distance would be 11,2 rods.

| | | |
|---|---|---|
| half= | 5,6 | |
| longest side | 15 | |
| | Ans. 84,0 rods. | |

Or, 11,2

15

2)168,0

Ans. 84,0 rods, as before.

If the three sides be 120,5, 112,6 and 90,3 rods, required ı area?

Ans. 4832,7 rods=30 acres and $32\frac{7}{10}$ perches.

Any irregular four-sided piece of land may be divided into o triangles by a diagonal line, and a five-sided piece into ee triangles by two diagonals. If the length of the sides agreed on, there can be no dispute on the admeasure- ınt, as all who are acquainted with the rule will agree in ı result.

## EXTRACTION OF THE CUBE ROOT.

To extract the Cube Root is to find out a number, which ing multiplied into itself, and then into that product, pro- ceeth the given number.

RULE. 1. Point every third figure of the cube given, be- ıning at the unit's place, seek the greatest cube to the first ınt and subtract it therefrom, put the root in the quotient, d bring down the figures in the next point to the remain- r for a resolvend.

2. Find a divisor by multiplying the square of the quotient

by 3. See how often it is contained in the resolvend, rejecting the units and tens, and put the answer in the quotient.

3. To find the *subtrahend*. 1. Cube the last figure in the quotient. 2. Multiply all the figures in the quotient by 3, except the last, and that product by the square of the last. 3. Multiply the divisor by the last figure. Add these products together, gives the subtrahend, which subtract from the resolvend; to the remainder bring down the next point, and proceed as before.

| Roots. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|---|---|---|---|
| Cubes. | 1. | 8. | 27. | 64. | 125. | 216. | 343. | 512. | 729. |

EXAMPLE.

What is the cube root of 99252847?

99252847(463
64=Cube of 4.

Divisor.
Square of 4×3=48)35252 Resolvend.

216=cube of 6
432 =4×3× by square of 6
288 =divisor × by 6

33336 Subtrahend

Divisor.
Square of 46×3=6348)1916847 Resolvend

27=cube of 3
1242 =46×3× by sq. of 3
19044 =divisor × by 3

1916847 Subtrahend.

*Another new and more concise method of extracting the* CUBE ROOT.

RULE. 1. Point every third figure of the cube given, beginning at the unit's place, then find the nearest cube to the first point, and subtract it therefrom, put the root in the quotient, bring down the figures in the next point to the remainder for a resolvend.

2. Square the quotient and triple the square for a divisor —as, 4×4×3=48. Find how often it is contained in the resolvend, rejecting units and tens, and put the answer in *the quotient.*

3. Square the last figure in the quotient, and put it on the right hand of the divisor:

As $6\times6=36$ put to the divisor $48=4836$.

4. Triple the last figure in the quotient, and multiply by the former, put it under the other, units under the tens, add them together, and multiply the sum by the last figure in the quotient, subtract that product from the resolvend, bring down the next point, and proceed as before.

EXAMPLES.

1. What is the cube root of 99252847?

Square of $4\times3=48$ divisor
Square of 6 put to $48=4836$
$6\times3\times4=72$

$5556\times6=33336$

Square of $46=2116\times3=6348$ div.
Square of $3=9$ put to $6348=$*634809
$3\times3\times46=414$

$638949\times3=1916847$

99252847(463
64

35252
33336

1916847

2. What is the cube root of 389017? Ans. 73.
3. What is the cube root of 5735339? Ans. 179.

When the given number consists of a whole number and decimal together, make the number of decimals to consist of 3, 6, 9, &c. places, by adding ciphers thereto, so that there may be a point fall on the unit's place of the whole number.

4. What is the cube root of 12,977875? Ans. 2,35.
5. What is the cube root of 36155,027576? Ans. 33,06+

*To extract the cube root of a vulgar fraction.*

RULE. Reduce the fraction to its lowest terms, then extract the cube root of the numerator and denominator for a new numerator and denominator; but if the fraction be a surd, reduce it to a decimal, and then extract the root from it.

* When the quotient is 1, 2, or 3, there must be a cipher put to supply the place of tens.

EXAMPLES.

1. What is the cube root of $\frac{2}{6}\frac{1}{5}\frac{6}{2}$? Ans. $\frac{4}{5}$.

SURD.

2. What is the cube root of $\frac{4}{7}$? Ans. ,829+

*To extract the cube root of a mixed number.*

RULE. Reduce the fractional part to its lowest terms, and then the mixed number to an improper fraction, extract the cube roots of the numerator and denominator for a new numerator and denominator; but if the mixed number given be a surd, reduce the fractional part to a decimal, annex it to the whole number, and extract the root therefrom.

EXAMPLES.

1. What is the cube root of $12\frac{5}{27}$? Ans. $2\frac{1}{3}$.

SURD.

2. What is the cube root of $7\frac{1}{3}$? Ans. 1,93+

## THE APPLICATION.

1. If a cubical piece of timber be 47 inches long, 47 inches broad, and 47 inches deep, how many cubical inches does it contain? Ans. 103823.

2. There is a cellar dug that is 12 feet every way, in length, breadth, and depth, how many solid feet of earth were taken out of it? Ans. 1728.

*To find the side of a cube that shall be equal in solidity to any given solid, as a globe, cylinder, prism, cone, &c.*

RULE. The cube root of the solid content of any solid body given is the side of the cube of equal solidity.

EXAMPLE.

If the solid content of a globe is 10648, what is the side of a cube of equal solidity? Ans. 22.

*The side of the cube being given, to find the side of that cube, that shall be double, treble, &c. in quantity to the given cube.*

RULE. Cube the side given, and multiply it by 2, 3, &c. the cube root of the product is the side sought.

EXAMPLE.

There is a cubical vessel, whose side is 12 inches, and it

s required to find the side of another vessel that is to con-
ain three times as much? Ans. 17,306.

## EXTRACTION OF THE BIQUADRATE ROOT.

To extract the Biquadrate Root is to find out a number, vhich being involved four times into itself, will produce the ;iven number.

RULE. First extract the square root of the given number, hen extract the square root of that square rdot, and it will ;ive the biquadrate root required.

EXAMPLES.

1. What is the biquadrate of 27? Ans. 531441.
2. What is the biquadrate root of 531441? Ans. 27.

## A GENERAL RULE

FOR EXTRACTING THE ROOTS OF ALL POWERS.

1. Prepare the number given for extraction, by pointing off from the unit's place as the root required directs.
2. Find the first figure in the root, by the table of powers, which subtract from the given number.
3. Bring down the first figure in the next point to the remainder, and call it the dividend.
4. Involve the root into the next inferior power to that which is given; multiply it by the given power, and call it the divisor.
5. Find a quotient figure by common division, and annex it to the root; then involve the whole root into the given power, and call that the subtrahend.
6. Subtract that number from as many points of the given power as are brought down, beginning at the lowest place, and to the remainder bring down the first figure of the next point for a new dividend.
7. Find a new divisor, and proceed in all respects as before.

EXAMPLES.

1. What is the square root of 141376? Ans. 376.
2. What is the cube root of 53157376? Ans. 376.
3. What is the biquadrate root of 19987173376? Ans. 376.

## DUODECIMALS.

DUODECIMALS, or Cross Multiplication, is a rule much use of in measuring and computing the dimensions of the several parts of buildings; it is likewise used to find ships' tonnage and the contents of bales, cases, &c.

Dimensions are taken in feet, inches, and parts.

Artificers' work is computed by different measures, viz—

Glazing, and masons' flat work, by the foot.

Painting, paving, plastering, &c. by the yard.

Partitioning, flooring, roofing, tiling, &c. by the square of 100 feet.

A perch of masons' work is $24\frac{3}{4}$ feet.

A square or cubic fathom is 216 feet.

The contents of bales, cases, &c. by the ton of 40 cubic feet.

The tonnage of ships, by the ton of 95 feet.

### *RULE FOR MULTIPLYING DUODECIMALLY.*

1. Under the multiplicand write the corresponding denominations of the multiplier.

2. Multiply each term in the multiplicand, (beginning at the lowest) by the feet in the multiplier; write each result under each respective term, observing to carry an unit from each lower denomination to its superior.

3. In the same manner, multiply the multiplicand by the inches in the multiplier, and write the result of each term, one place more to the right hand of them, in the multiplicand.

4. Work in the same manner with the other parts in the multiplier, setting the result of each term two places to the right hand of those in the multiplicand, and so on for thirds, fourths, &c.

5. Proceed in the like manner with all the rest of the denominations, and their sum will give the answer required.

EXAMPLES.

1. Multiply 4 feet 9 inches by 8 inches.

| | |
|---|---|
| 4 | 9 |
| | 8 |
| 3 | 2 |

Ans. 3 feet 2 inches.

2. Multiply 9 feet 6 inches by 4 feet 9 inches.

| | ft. | in. |
|---|---|---|
| | 9 | 6 |
| | 4 | 9 |
| ft. in. | | |
| 9 6×4 feet = | 38 | 0 |
| 9 6×9 inc. = | 7 | 1 6 |
| | 45 | 1 6 |

Ans. 45 feet 1 inch and 6 twelfths.

3. In a load of wood 8 feet 4 inches long, 4 feet 3 inches wide, 3 feet 6 inches high, how many cubic or solid feet?

| | | |
|---|---|---|
| | 8 | 4 |
| | 3 | 6 |
| | 25 | 0 |
| 6½ | 4 | 2 |
| | 29 | 2 |
| | 4 | 3 |
| | 116 | 8 |
| 3¼ | 7 | 3½ |

16)124 (7 feet.
112

12
4

16)48(3 quarters.
48

Ans. 7¾ feet.

| | | ft. | in. | ft. | in. | ft. | in. | cords. | ft. |
|---|---|---|---|---|---|---|---|---|---|
| 4. | A load | 10 | 5 | 5 | 4 | 4 | 4 | Ans. 1 | 7 |
| 5. | " | 12 | 7 | 7 | 6 | 4 | 8 | 3 | 3½ |
| 6. | " | 11 | 8 | 6 | 6 | 5 | 6 | 3 | 2 |
| 7. | " | 22 | 6 | 7 | 4 | 6 | 6 | 8 | 3 |

8. What is the price of a marble slab, whose length is 5 feet 7 inches, and breadth 1 foot 10 inches, at one dollar per foot? Ans. $10,23.

9. There is a house with three tiers of windows, 3 in a tier, the height of the first tier is 7 feet 10 inches, of the second 6 feet 8 inches, and of the third 5 feet 4 inches, and the breadth of each is 3 feet 11 inches: what will the glazing come to, at 14*d.* per foot? Ans. £13 11*s.* 10½*d.*

10. If a house measures within the walls 52 feet 8 inches in length, and 30 feet 6 inches in breadth, and the roof be of a true pitch, or the rafters $\frac{3}{4}$ of the breadth of the building, what will it come to, roofing at 10*s.* 6*d.* per square?

Ans. £12 12*s.* 11$\frac{1}{2}$*d.*

## APPLICATION OF DUODECIMALS.

*To find how many cubic or solid square feet (in order to ascertain the freight) are contained in cases, bales, &c. that is, how many cubic feet they will take up in a ship.*

### EXAMPLES.

1. Suppose the dimensions of a bale be 7 feet 6 inches, 3 feet 3 inches, and 1 foot 10 inches: what is the solid content? Ans. 44 feet 8 inches.

2. What is the freight of a bale, containing 96 feet 9 inches, at $15 per ton of 40 feet, or 37$\frac{1}{2}$ cents per foot?

Ans. $24,65$\frac{1}{2}$.

3. A merchant imports from London 6 bales of the following dimensions, viz.

| | Length. | | Height. | | Depth. | |
|---|---|---|---|---|---|---|
| | *ft.* | *in.* | *ft.* | *in.* | *ft.* | *in.* |
| No. 1. | 2 | 10 | 2 | 4 | 1 | 9 |
| 2. | 2 | 10 | 2 | 6 | 1 | 3 |
| 3. | 3 | 6 | 2 | 2 | 1 | 8 |
| 4. | 2 | 10 | 2 | 8 | 1 | 9 |
| 5. | 2 | 10 | 2 | 6 | 1 | 9 |
| 6. | 2 | 11 | 2 | 8 | 1 | 8 |

What are the solid contents, and how much will the freight amount to, at 20 dollars per ton? The contents are, viz.

| | *ft.* | *in.* |
|---|---|---|
| No. 1. | 11 | 7 |
| 2. | 8 | 10 |
| 3. | 12 | 7 |
| 4. | 13 | 2 |
| 5. | 12 | 5 |
| 6. | 13 | 0 |
| | 71 | 7 |

Ans. $35,79.

*To find Ships' Tonnage by Carpenters' Measure.*

RULE. For single decked vessels, multiply the length, breadth at the main beam, and depth of the hold together, and divide the product by 95.

EXAMPLE.

What is the tonnage of a single decked vessel, whose length is 60 feet, breadth 20 feet, and depth 8 feet?

$$60\times20=1200\times8=9600$$

$$\frac{9600}{95}=101\tfrac{5}{95}\text{ tons.}$$

This is the usual method of tonnaging a single decked vessel, having the deck bolted to the wale. But if it be required that the deck be bolted at any height above the wale, and there is no special agreement, the custom is to pay the carpenter for one half of the additional height, to which the deck may be thus raised; that is, one half of the difference being added to the former depth gives the depth to be used in calculating the tonnage.

EXAMPLE.

A merchant, after having contracted with a carpenter to build a single-decked vessel of 60 feet keel, 20 feet beam, and 8 feet hold, desires that the deck be laid for 10 feet hold; required the tonnage to be paid for?

60 length
20 breadth

1200

1=½ diff. of depth + 8=9

10800(113$\frac{85}{95}$ tons.

95

RULE. For a double decked vessel, take half the breadth of the main beam for the depth of the hold, and work as for a single decked vessel.

EXAMPLE.

What is the tonnage of a double decked vessel, whose length is 65 feet, and breadth 21 feet 6 inches?

$$65\times21\ 6=1397\ 6$$

$$1397\ 6\times10\ 9=15023$$

$$\frac{15023}{95}=158\tfrac{13}{95}\text{ tons.}$$

### *To find the Government Tonnage.*

"If the vessel be double-decked, take the length thereof from the fore part of the main stem, to the after part of the stern post, above the upper deck; the breadth thereof at the broadest part above the main wales, half of which breadth shall be accounted the depth of such vessel, and then deduct from the length, three-fifths of the breadth, multiply the remainder by the breadth and the product by the depth, and divide this last product by 95, the quotient whereof shall be deemed the true contents or tonnage of such ship or vessel; and if such ship or vessel be single-decked, take the length and breadth, as above directed, deduct from the said length three-fifths of the breadth, and take the depth from the under side of the deck plank to the ceiling in the hold, then multiply and divide as aforesaid, and the quotent shall be deemed the tonnage."

#### Examples.

1. What is the government tonnage of a single-decked vessel, whose length is 69 feet 6 inches, breadth 22 feet 6 inches, and depth 8 feet 6 inches?

$\frac{3}{5}$ of 22 6 = 13 6 — 69 6 — 13 6 = 56 0

$$\frac{56 \times 22\ 6 \times 8\ 6 = 10710}{95} = 112\tfrac{70}{95} \text{ tons.}$$

2. What is the government tonnage of a double-decked vessel, of the following dimensions, length 75 feet 6 inches, breadth 23 feet 4 inches, and depth 11 feet 8 inches?

$\frac{3}{5}$ of 23 4 = 14 0

75 6 — 14 0 = 61 6

$$\frac{61\ 6 \times 23\ 4 \times 11\ 8 = 16741}{95} = 176\tfrac{21}{95} \text{ tons.}$$

The tonnage may be found by using a table of logarithms, the inches being reduced to decimals, as in the following example.

What is the government tonnage of the ship London, the keel of which is 112 feet and the beam 28 feet 7 inches?

| | | |
|---|---|---|
| | 112 | 0 |
| $\frac{8}{5}$ of Beam | 17 | $1\frac{1}{5}$ |
| | 94 | $10\frac{1}{5}$ |

| | *ft.* | |
|---|---|---|
| Length | 94,85 | . . 1,977037 |
| Beam | 28,58 | . . 1,456062 |
| $\frac{1}{2}$ do. | 14,29 | . . 1,155032 |
| Arithmetical complement of | 95 | . . 8,022276 fixed number. |
| | | 12,610407 |

Rejecting 10 is 2,610407, Giving 407$\frac{11}{95}$ tons.

*Carpenters' Measure.*

| *Keel.* | *Beam.* | *Hold.* | *Tons. 95ths.* |
|---|---|---|---|
| 38 feet | 15 ft. 8 ins. | 5 ft. 6 ins. Single Deck | 34 44 |
| 51 6 | 21 9 | 8 3 . . . . . | 97 26 |
| 51 2 | 21 1 | 8 2 . . . . . | 92 69 |
| 48 $8\frac{1}{2}$ | 18 8 | 8 2 . . . . . | 78 15 |
| 70 6 | 25 $6\frac{1}{2}$ | Double Deck . . . | 242 6 |
| 93 8 | 30 5 | . . . . . | 456 8 |
| 68 0 | 22 7 | . . . . . | 182 50 |
| 85 4 | 26 $11\frac{1}{2}$ | . . . . . | 326 37 |

*Government Measure.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 68 | 6 | 19 | $4\frac{3}{4}$ | 10 | $2\frac{1}{2}$ Single Deck . | 118 | 42 |
| 63 | 8 | 19 | 3 | 8 | 0 . . . . . | 84 | 47 |
| 63 | 9 | 18 | $7\frac{1}{2}$ | 7 | 9 . . . . . | 79 | 88 |
| 65 | 0 | 18 | 6 | 7 | 9 . . . . . | 81 | 32 |
| 112 | 0 | 28 | 7 | Double Deck . . . . | | 407 | 81 |
| 100 | 4 | 26 | 7 | . . . . . | | 313 | 80 |
| 99 | 8 | 27 | 2 | . . . . . | | 323 | 78 |
| 106 | 2 | 26 | 1 | . . . . . | | 324 | 6 |
| 108 | 2 | 26 | 10 | . . . . . | | 348 | 86 |
| 108 | 2 | 27 | $0\frac{1}{2}$ | . . . . . | | 353 | 81 |

# TABLES OF CORDAGE.

*A CORDAGE TABLE, showing how many fathoms, feet, and inches of a Rope, of any size, not more than 14 inches, make a hundred weight; with the use of the Table.*

| Inches. | Fathoms. Feet. Inches. | Inches. | Fathoms. Feet. Inches. | Inches. | Fathoms. Feet. Inches. | Inches. | Fathoms. Feet. Inches. |
|---|---|---|---|---|---|---|---|
| 1 | 486 0 0 | 4¼ | 26 5 3 | 7½ | 8 4 0 | 10¾ | 4 1 8 |
| 1¼ | 313 3 0 | 4½ | 24 0 0 | 7¾ | 8 3 6 | 11 | 4 0 3 |
| 1½ | 216 3 0 | 4¾ | 21 3 0 | 8 | 7 3 6 | 11¼ | 3 5 7 |
| 1¾ | 159 3 0 | 5 | 19 3 0 | 8¼ | 7 0 8 | 11½ | 3 4 1 |
| 2 | 124 3 0 | 5¼ | 17 4 0 | 8½ | 6 4 3 | 11¾ | 3 3 3 |
| 2¼ | 96 2 0 | 5½ | 16 1 0 | 8¾ | 6 2 1 | 12 | 3 2 3 |
| 2½ | 77 3 0 | 5¾ | 14 4 6 | 9 | 6 0 0 | 12¼ | 3 2 1 |
| 2¾ | 65 4 0 | 6 | 13 3 0 | 9¼ | 5 4 0 | 12½ | 3 2 0 |
| 3 | 54 0 0 | 6¼ | 12 2 0 | 9½ | 5 2 0 | 12¾ | 2 7 8 |
| 3¼ | 45 5 2 | 6½ | 11 3 0 | 9¾ | 5 0 6 | 13 | 2 5 3 |
| 3½ | 39 3 0 | 6¾ | 10 4 0 | 10 | 4 5 0 | 13¼ | 2 4 9 |
| 3¾ | 34 3 9 | 7 | 9 5 6. | 10¼ | 4 4 1 | 13½ | 2 4 0 |
| 4 | 30 1 6 | 7¼ | 9 1 6 | 10½ | 4 2 2 | 13¾ | 2 3 6 |
| | | | | | | 14 | 2 2 1 |

## *USE OF THE TABLE.*

At the top of the table, marked inches, fathoms, feet, inches, the first column is the thickness of the rope in inches and quarters; and the other three, the fathoms, feet, and inches, that make up a hundred weight of such a rope. One example will make it plain:

Suppose you desire to know how much of a seven-inch rope will make a hundred weight; find 7 in the third column under inches, or thickness of rope, and against it in the fourth column you find 9, 5, 6, which shows that there will be 9 fathoms, 5 feet, and 6 inches, required to make up one hundred weight.

*A TABLE, showing the weight of any Cable or Rope, of* 120 *fathoms in length, and for every half inch, from* 3 *to* 24 *inches in circumference.*

| Inches | Cwt. | Qrs. | Inches | Cwt. | Qrs. | Inches | Cwt. | Qrs. | Inches | Cwt. | Qrs. | Inches | Cwt. | Qrs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 2 | 1 | 7½ | 14 | 0 | 12 | 36 | 0 | 16½ | 68 | 0 | 20½ | 105 | 0 |
| 3½ | 3 | 0 | 8 | 16 | 0 | 12½ | 39 | 0 | 17 | 72 | 1 | 21 | 110 | 1 |
| 4 | 4 | 0 | 8½ | 18 | 0 | 13 | 42 | 1 | 17½ | 76 | 2 | 21½ | 115 | 2 |
| 4½ | 5 | 0 | 9 | 20 | 1 | 13½ | 45 | 2 | 18 | 81 | 0 | 22 | 121 | 0 |
| 5 | 6 | 1 | 9½ | 22 | 2 | 14 | 49 | 0 | 18½ | 85 | 2 | 22½ | 126 | 2 |
| 5½ | 7 | 2 | 10 | 25 | 0 | 14½ | 52 | 2 | 19 | 90 | 1 | 23 | 132 | 1 |
| 6 | 9 | 0 | 10½ | 27 | 2 | 15 | 56 | 1 | 19½ | 95 | 0 | 23½ | 138 | 0 |
| 6½ | 10 | 2 | 11 | 30 | 1 | 15½ | 60 | 0 | 20 | 100 | 0 | 24 | 144 | 0 |
| 7 | 12 | 1 | 11½ | 33 | 0 | 16 | 64 | 0 | | | | | | |

*USE OF THE TABLE.*

The first column, marked for inches, is the thickness or circumference of the cable, to every ½ inch, from 3 to 24 inches; the second is marked cwt. qrs. for the hundred weights and quarters that it will weigh if 120 fathoms in length.

For instance: Suppose it be a cable of 14½ inches; look against 14½, and you will find in the other column 52 cwt. 2 qrs., which shows that 120 fathoms of 14½ inch cable will weigh 52 cwt. 2 qrs., and so in others; and any quantity of a less length will weigh in proportion.

A ship was brought to anchor in a gale of wind; but the gale increasing, it was thought safest to cut the cables, in consequence of which 75 fathoms of 16 inches, and 50 fathoms of 12 inches were lost; what must they be valued at in calculating the average, new cordage being then 14 dollars per cwt.?

CALCULATION.

| | | | | | |
|---|---|---|---|---|---|
| 120 fath. | 16 in. cab. | =64 cwt. | 120 fath. | 12 in. cab. | =36 cwt. |
| 60 | do. | 32 | 40 | do. | 12 |
| 15 | do. | 8 | 10 | do. | 3 |
| 75 fath. | weighing | 40 | 50 fath. | weighing | 15 |
| 50 do. | | 15 | | | |
| | | 55 cwt. at $14 per cwt. | | | $770 00 |
| | | ⅛ deducted for new | | | 256 66⅔ |
| | | | | Ans. | $513 33⅓ |

*A TABLE, showing the weight of Iron Cables of 90 fathoms; and also the comparative strength of Iron and Hemp Cables.*

| Iron. | | | Hemp. | | Cwt. |
|---|---|---|---|---|---|
| At | 1¾ | inch | =17 | inches, and weighs | 123 |
| | 1⅝ | " | 16 | " | 107 |
| | 1½ | " | 15 | " | 92 |
| | 1⅜ | " | 14 | " | 78 |
| | 1¼ | " | 13 | " | 65 |
| | 1⅛ | " | 12 | " | 52 |
| | 1 | " | 10½ | " | 42 |
| | ⅞ | " | 9 | " | 33 |
| | ¾ | " | 8 | " | 24 |
| | ⅝ | " | 7 | " | 17 |
| | 9/16 | " | 6½ | " | 14 |
| | ½ | " | 6 | " | 12 |

## GEOGRAPHICAL QUESTIONS.

*A TABLE, showing the number of miles contained in a Degree of Longitude, in each Parallel of Latitude, from the Equator to the Poles.*

| Degrees of Lat. | Miles. | 100ths of a mile. | Degrees of Lat. | Miles. | 100ths of a mile. | Degrees of Lat. | Miles. | 100ths of a mile. | Degrees of Lat. | Miles. | 100ths of a mile. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 59 | 96 | 24 | 54 | 81 | 47 | 41 | 00 | 70 | 20 | 52 |
| 2 | 59 | 94 | 25 | 54 | 38 | 48 | 40 | 15 | 71 | 19 | 54 |
| 3 | 59 | 92 | 26 | 54 | 00 | 49 | 39 | 36 | 72 | 18 | 55 |
| 4 | 59 | 86 | 27 | 53 | 44 | 50 | 38 | 57 | 73 | 17 | 54 |
| 5 | 59 | 77 | 28 | 53 | 00 | 51 | 37 | 73 | 74 | 16 | 53 |
| 6 | 59 | 67 | 29 | 52 | 48 | 52 | 37 | 00 | 75 | 15 | 52 |
| 7 | 59 | 56 | 30 | 51 | 96 | 53 | 36 | 18 | 76 | 14 | 51 |
| 8 | 59 | 40 | 31 | 51 | 43 | 54 | 35 | 26 | 77 | 13 | 50 |
| 9 | 59 | 20 | 32 | 50 | 88 | 55 | 34 | 41 | 78 | 12 | 48 |
| 10 | 59 | 08 | 33 | 50 | 32 | 56 | 33 | 55 | 79 | 11 | 45 |
| 11 | 58 | 89 | 34 | 49 | 74 | 57 | 32 | 67 | 80 | 10 | 42 |
| 12 | 58 | 68 | 35 | 49 | 15 | 58 | 31 | 70 | 81 | 09 | 38 |
| 13 | 58 | 46 | 36 | 48 | 54 | 59 | 30 | 90 | 82 | 08 | 35 |
| 14 | 58 | 22 | 37 | 47 | 92 | 60 | 30 | 00 | 83 | 07 | 32 |
| 15 | 58 | 00 | 38 | 47 | 28 | 61 | 29 | 04 | 84 | 06 | 28 |
| 16 | 57 | 60 | 39 | 46 | 62 | 62 | 28 | 17 | 85 | 05 | 23 |
| 17 | 57 | 30 | 40 | 46 | 00 | 63 | 27 | 24 | 86 | 04 | 18 |
| 18 | 57 | 04 | 41 | 45 | 28 | 64 | 26 | 30 | 87 | 03 | 14 |
| 19 | 56 | 73 | 42 | 44 | 95 | 55 | 25 | 36 | 88 | 02 | 09 |
| 20 | 56 | 38 | 43 | 43 | 88 | 66 | 24 | 41 | 89 | 01 | 05 |
| 21 | 56 | 00 | 44 | 43 | 16 | 67 | 23 | 45 | 90 | 00 | 00 |
| 22 | 55 | 63 | 45 | 42 | 43 | 68 | 22 | 48 | | | |
| 23 | 55 | 23 | 46 | 41 | 68 | 69 | 21 | 51 | | | |

## *USE OF THE TABLE.*

1. How many miles are the inhabitants of Quito, near the equator, and those of St. Petersburg, in lat. 60° N. carried round by the diurnal motion of the earth?

| | |
|---|---|
| 360° | 360° |
| In Quito 1°=60 miles. | In St. Petersburg 1°=30 miles. |
| $\frac{1}{6}$)21600 G. ms. | $\frac{1}{6}$)10800 G. ms. |
| 3600 | 1800 |
| Ans. 25200 S. ms. | Ans. 12600 S. ms. |

2. What is the distance from Charleston light-house, in long. 80° W. to Bermudas, in long. 64° W. and both in lat. 32° North.

80°—64=16° diff. long.
1° in lat. 32° is 51 miles.

16°×51=816 G. miles.

In like manner may the distance be found between the following places.

| | | | | | |
|---|---|---|---|---|---|
| From C. May, lon. 75 W. | | to Fayal, lon. 29 W. | | both in 38 | N. |
| Boston | 71 | C. Finisterre | 9 | 42 | |
| New-York | 74 | Oporto | 8 | 41 | |
| Portland | 70 | Bilboa | 3 | 43 | |
| New Haven | 73 | Rome | 12 E. | 41 | |
| Baltimore | 77 | Smyrna | 27 | 39 | |

If two places be in the same longitude, the difference of their latitudes is the distance between them.

Required the distance between the city of Washington, in lat. 38° N., and Lima, in lat. 12 S., both in long. 77 W.
38°+12°=50°×60=3000, the distance in G miles.

**How many miles is the Cape of Good Hope South and East of Philadelphia?**

| | | | | | |
|---|---|---|---|---|---|
| Cape of G. Hope, lat. | 34° S. | 34° | long. | 18° | 23′ E. |
| Philadelphia, | 40 N. | 40 | | 75 | 16 W. |
| Diff. of latitude | 74 | 2)74 | diff. long. | 93 | 39 |
| | 60 | — | | 60 | |
| | | 37 | | | |
| | 4440 miles. | — | | 5619 miles. | |

In the middle latitude 37°, a degree is 48 miles, then 60 : 48 : : 5619 : 4495 miles. Or, $98\frac{1}{2}° \times 48 = 4485$ G. ms.
Ans. 4440 G. miles, S. and 4495 G. miles E.

The square root of the sum of the squares of the difference of latitude and departure will give the *distance* between them.

The ship Columbus was spoken in lat. 37° 57′ N. and long. 67° 38′ W. bound to a port in lat. 42° 17′ N. and long. 72° 38′ W. What is the distance to the port? Ans. 347.

To find the *bearing* of one place from another by Arithmetic.

RULE. To the distance, as found in the last case, add half the greater of the other two numbers, whether it be latitude or departure, and say,—As the sum is to the less number, so is 86 to the degrees, or angle required, if the difference of latitude be more than the departure. But if the departure be greater, the fourth number, found as above, must be taken from 90° for the answer.

EXAMPLE.

The city of A. is north and west of the town of B. The difference of latitude between them is 260 miles, the departure 230, and the distance 347 miles. Required the bearing of A. from B.

347
130

477 : 230 : : 86°
86

1380
1840

477)19780(41° \
1908

700
477

223
60

477)13380(28′
954

3840
3816

Taking $\frac{1}{10}$ or $\frac{1}{100}$ of large numbers, will be sufficiently exact for geographical purposes: thus,

34
13

47 : 23 : : 86
23

258
172

47)1978(42° Answering
188 nearly to N. W. $\frac{1}{4}$ N.
98 or N. W. b. N. $\frac{2}{4}$ W.
94

If the bearing of B. from A. was required, it would be 90—42°=48°, or S.E. $\frac{1}{4}$ E.

Suppose the difference of latitude between two places is 1970 miles; the difference of longitude, reduced to departure, is 955 miles, and the distance deduced thence 2139: Required the bearing?

21
9

30 : 9 : : 86
9

30)774

Ans. 26° nearly.

Supposing 1970 miles to be departure, the answer would be 90°—26°=64°.

If the former case, 26°
In the latter . . 64

| *Given distance.* | *Diff. latitude.* | *Departure.* | *Bearing.* |
|---|---|---|---|
| 102 | 82 | 60 | Ans. 36° |
| 153 | 146 | 46 | 17 |
| 186 | 165 | 85 | 27 |
| 102 | 60 | 82 | 54 |
| 153 | 46 | 146 | 73 |
| 135 | 112 | 74 | 33 |

When the difference of latitude and departure are alike, or nearly so, the answer is 45°, and needs no calculation to find it; as in the example from Philadelphia to the Cape of Good Hope, which in that case is 45°, or S. E., as the Cape is South and East of that city.

When there is little or no departure, the bearing is *North* or *South*; and when it is so with the latitude, the bearing is *East* or *West*.

*A TABLE OF ANGLES, which every Point and Quarter Point of the Compass makes with the Meridian.*

| NORTH. | | Points. | ° ′ | SOUTH. | |
|---|---|---|---|---|---|
| | | 0 ¼ | 2 49 | | |
| | | 0 ½ | 5 37 | | |
| | | 0 ¾ | 8 26 | | |
| N.*b*.E. | N.*b*.W. | 1 | 11 15 | S.*b*.E. | S.*b*.W. |
| | | 1 ¼ | 14 04 | | |
| | | 1 ½ | 16 52 | | |
| | | 1 ¾ | 19 41 | | |
| N.N.E. | N.N.W. | 2 | 22 30 | S.S.E. | S.S.W. |
| | | 2 ¼ | 25 19 | | |
| | | 2 ½ | 28 07 | | |
| | | 2 ¾ | 30 56 | | |
| N.E.*b*.N. | N.W.*b*.N. | 3 | 33 45 | S.E.*b*.S. | S.W.*b*.S. |
| | | 3 ¼ | 36 34 | | |
| | | 3 ½ | 39 22 | | |
| | | 3 ¾ | 42 11 | | |
| N.E. | N.W. | 4 | 45 00 | S.E. | S.W. |
| | | 4 ¼ | 47 49 | | |
| | | 4 ½ | 50 37 | | |
| | | 4 ¾ | 53 26 | | |
| N.E.*b*.E. | N.W.*b*.W. | 5 | 56 15 | S.E.*b*.E. | S.W.*b*.W. |
| | | 5 ¼ | 59 04 | | |
| | | 5 ½ | 61 52 | | |
| | | 5 ¾ | 64 41 | | |
| E.N.E. | W.N.W. | 6 | 67 30 | E.S.E. | W.S.W. |
| | | 6 ¼ | 70 19 | | |
| | | 6 ½ | 73 07 | | |
| | | 6 ¾ | 75 56 | | |
| E.*b*.N. | W.*b*.N. | 7 | 78 45 | E.*b*.S. | W.*b*.S. |
| | | 7 ¼ | 81 34 | | |
| | | 7 ½ | 84 22 | | |
| | | 7 ¾ | 87 11 | | |
| East. | West. | 8 | 90 00 | East. | West. |

*To reduce degrees of longitude into time.*

RULE. Multiply the degrees by 4 for minutes of time, and the minutes or miles of longitude by 4 for seconds, and divide the products by 60 for time.

EXAMPLE.

Required the time answering to 42° 43′ 45″ of longitude.

| | hrs. | ms. | sec. |
|---|---|---|---|
| 42° × 4 = 168 ÷ 60 = | 2 | 48 | 0 |
| 43′ × 4 = 172 ÷ 60 = | 0 | 2 | 52 |
| 45″ × 4 = 189 ÷ 60 = | 0 | 0 | 3 |
| Ans. | 2 | 50 | 55 |

*To reduce time into degrees of longitude.*

RULE. Multiply the hours by 15 for degrees, and divide the minutes and seconds respectively by 4.

EXAMPLES.

1. Reduce 8 hrs. 37 ms. 38 sec. to degrees of longitude.

| | | | |
|---|---|---|---|
| 8 × 15 = | 120° | 0′ | 0″ |
| 37 ÷ 4 = | 9 | 15 | 0 |
| 38 ÷ 4 = | 0 | 9 | 30 |
| Ans. | 129 | 24 | 30 |

2. What is the difference of longitude and time between Philadelphia, in longitude 75° 19′ W. and Alexandria in Egypt in 30° 16′ East?

| | | |
|---|---|---|
| Philadelphia | 75° | 19′ W. |
| Alexandria | 30 | 16 E. |
| Diff. long. | 105 | 35 |

105° × 4 = 420′ 0″

35′ × 4 = 2 20

60) 422 20

105° 35′ = hrs. 7 2 20

Hence, when it is noon at Philadelphia, it is 7 hrs. 2 ms. 20 sec. in the afternoon at Alexandria; and when it is noon at Alexandria, it is only 4 hrs. 57 ms. 40 sec. in the morning at Philadelphia—thus,

| | | |
|---|---|---|
| | 12 | 0 0 |
| | 7 | 2 20 |
| hrs. | 4 | 57 40 |

NOTE. When the place required is *east* of the one given, the *time* required will be as much *later* in the day, as the difference of longitude, reduced to time, gives hours and minutes; and when *west* of the given place, it will be so much *earlier*.

When it is 20 minutes past 2 o'clock in the afternoon at Marseilles, in longitude 5° 22′ E. what time is it at Boston light-house, in longitude 70° 58′ W.

Ans. 9 hrs. 14 ms. 40 sec. in the morning.

*To find the part of the Globe opposite to a given place.*

RULE. Take the same latitude of an opposite name for the place required, and subtract the longitude of the given place from 180°, the remainder is the longitude of the place required, but of an opposite name.

EXAMPLES.

1. Required the opposite part of the globe to London, in latitude 51° 31′ N. and near the first meridian.

| | | | | | | |
|---|---|---|---|---|---|---|
| London | lat. | 51° | 31′ | N. | long. | 0° 00′ |
| Opposite place | | 51 | 31 | S. | | 180 00 |

2. Required the opposite part of the globe to Boston.

| | | | | | | |
|---|---|---|---|---|---|---|
| Boston | lat. | 42° | 23′ | N. | long. | 71° 03′ W. |
| Opposite place | | 42 | 23 | S. | long. | 108 57 E. |

3. Suppose a ship in any of the following places, what place on the globe would be opposite to it?

| *S. Lat.* | | *E. Long.* | | | *W. Long.* | |
|---|---|---|---|---|---|---|
| In 42° | 34′ | 109° | 05′ | Ans. Salem in | 70° | 55′ |
| 38 | 53 | 102 | 41 | City of Washington | 77 | 19 |
| 40 | 28 | 105 | 48 | New York | 74 | 12 |
| 39 | 57 | 104 | 41 | Philadelphia | 75 | 19 |
| 32 | 44 | 99 | 53 | Charleston, S. C. | 80 | 07 |
| 39 | 20 | 103 | 05 | Baltimore | 76 | 55 |
| 43 | 39 | 109 | 47 | Portland | 70 | 13 |
| 41 | 18 | 106 | 58 | New Haven | 73 | 02 |

*To estimate the distance of objects at sea.*

Multiply the square root of the height in feet by $11\frac{1}{2}$, and point off the unit's figure in the product for decimal parts, the remainder is the miles required—thus,

| *Height.* | *Sq. Root.* | | *Miles.* | |
|---|---|---|---|---|
| At 16 feet - | 4 | × $11\frac{1}{2}$ = | 4,6 | the distance. |
| 25 - - - - - | 5 | " = | 5,7 | |
| 36 - - - - - | 6 | " = | 6,9 | |
| 49 - - - - - | 7 | " = | 8,0 | |
| 81 - - - - - | 9 | " = | 10,3 | |
| 144 - - - - - | 12 | " = | 13,8 | |
| 900 - - - - - | 30 | " = | 34,5 | |
| 2500 - - - - - | 50 | " = | 57,5 | |
| 3600 - - - - - | 60 | " = | 69,0 | |
| 5285 - - - - - | 72,7 | " = | 83,6 | |

## *PLANETARY MOTION.*

***To find the velocity of a Planet's motion in its orbit.***

RULE. As 1 is to 3,14159, so is the diameter of the Planet's orbit to its circumference, and as the time of revolving is to the circumference, so is the given time to the distance required.

EXAMPLE.

If the Earth moves round the Sun in a year, at the distance of 95 millions of miles, what is the hourly velocity of of its motion?

95
2

1 : 3,14+ :: 190,000,000
3,14+

365)596,000,000 circumference.

24)1,634,520

Ans. 68,105 miles per hour.

The distances of the other planets from the sun, and the times of their revolving round it being known, the daily and hourly velocity of their motion in their orbits may be found as in the preceding example.

| | *Mean distances.* | *Time of revolving.* |
|---|---|---|
| Mercury | 37 millions | 88 days. |
| Venus | 68 | 224 |
| Mars | 144 | 687 |
| Jupiter | 490 | 4332 |
| Saturn | 900 | 10759 |
| Herschel | 1800 | 30737 |

## *MISCELLANEOUS QUESTIONS.*

**1.** If Gunter's chain of 100 links be equal to 4 rods or perches, what is the length of 1 link, and how many square links in an acre?

4 Rods=66 feet.
12

100)792

7,92 in. to a link.
7,92

Ins. 62,7264=1 sq. link.

1 Acre = 43560 sq. ft.
144 inches.

62,7264)6272640

Ans. 100000 links.

**2.** In 23 chains 48 links, how many rods, &c.?

23,48
4

93,92
16½

1472
46

15,18
12

2,$\frac{16}{100}$=$\frac{4}{25}$.

Ans. 93 rds. 15 ft. 2$\frac{4}{25}$ ins

**3.** How many chains in a mile?

1 mile = 1760 yds.

——— = 80 chains.

1 Chain = 22

**4.** In 534 chains, 72 links, how many miles?

80)534,72

6,684
1760

1203,840

——— Ans. 6 miles 1203¾ yds.

**5.** If the tunnel of a canal at the base be 18 feet, and the height 12 feet, how many cubic yards in every running yard?

18×12×3=648

———=24 yards.

3×3×3= 27

**6.** How many cubic feet of water in a pond, containing 95 acres, 20 feet deep?

1 Acre = 43560 ft. × 95 = 4138200
20

Ans. 82,764,000 Cubic feet.

7. What quantity of water may be retained in the following ponds, if used as reservoirs for a canal?

| | | | | Cubic feet. |
|---|---|---|---|---|
| U. | 286 acres | 20 feet deep | = | 249,163,200 |
| L. | 208 " | 10 " | = | 90,604,800 |
| E. | 66 " | 10 " | = | 28,749,600 |
| W. | 27 " | 10 " | = | 11,761,200 |
| G. | 139 " | 20 " | = | 121,096,800 |
| W. | 152 " | 20 " | = | 132,422,400 |
| Whole | 878 | | Cubic feet | 633,798,000 |

8. Suppose a loss of 1 foot by evaporation from the surfaces of these 6 ponds, how many feet in the whole?

1 acre = 43560 feet × 878 acres = 38,245,680 Cubic feet.

9.

| | | | |
|---|---|---|---|
| 57 | yards at | $79\frac{3}{4}$ cts. | $45,45$\frac{3}{4}$ |
| $79\frac{1}{2}$ | " | 57 | |
| $87\frac{3}{4}$ | " | 49 | |
| $115\frac{3}{4}$ | " | $1,11 | |
| 2764 | " | $32\frac{1}{8}$ | |
| 7496 | " | $27\frac{3}{8}$ | |
| 4672 | " | $15\frac{5}{16}$ | |
| 1952 | " | $9\frac{1}{8}$ | |
| | | Ans. | $4105,49$\frac{3}{4}$ cts |

10. Three pieces of land measuring, viz.

| | | | Cwt. qrs. lbs. |
|---|---|---|---|
| 1 piece | 253 ft. by 24 ft. | produced | 10 3 0 of hay. |
| 2 " | 252 | $19\frac{1}{2}$ " | 9 0 0 |
| 3 " | 252 | $20\frac{1}{2}$ " | 11 0 0 |

What was the produce of each equal to per acre?

| | | Tons. |
|---|---|---|
| Ans. 1 piece | equal to | 3 17 0 13 per acre. |
| 2 " | " | 3 19 3 3 |
| 3 " | " | 4 12 3 0 |

11. The births in a certain town were 475, and the proportion 13 boys to 12 girls. What is the number of each?

Ans. 247 boys, and 228 girls.

12. How many yards of carpet, yard wide, will cover a floor 25 feet long, and 18 wide? Ans. 50 yards.

13. How many trees, 4 feet apart every way, may grow in a nursery of one acre of ground? Ans. 2722 trees.

14. If a ship of 350 tons, chartered at 3*s.* a ton per month, deliver a cargo of 600 tons, what is the real rate per ton?

Ans. 1*s.* 9*d.*

15. A farmer raised 43 tons 11 cwt. 3 qrs. 14 lb. of carrots on 1 acre 1 rood and 25 perches. What was it per acre? Ans. 31 tons.

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | *s* | *d* | | |
| 16. | $411\frac{1}{4}$ | yds. at | 14 | $7\frac{1}{2}$ | per yard | Ans. to each £300 14 $6\frac{1}{4}$ |
| | $246\frac{3}{4}$ | | 24 | $4\frac{1}{2}$ | | |
| | $82\frac{1}{2}$ | | 7 | $3\frac{3}{4}$ | | |
| | $164\frac{1}{2}$ | | 36 | $6\frac{3}{4}$ | | |
| | $493\frac{1}{2}$ | | 12 | $2\frac{1}{4}$ | | |
| | $2467\frac{1}{2}$ | | 2 | $5\frac{1}{4}$ | | |
| | $215\frac{2}{3\frac{1}{2}}$ | | 27 | $10\frac{3}{7}$ | | |

17. There are two numbers in proportion as 3 to 11, the greater is 3267, what is the sum of both? Ans. 4158.

18. The Chinese wall is said to be 1200 miles in length, averaging 18 feet high, and as many thick, how many solid fathoms does it contain? Ans. 9,504,000 fathoms.

19. Suppose a steam-boat at $\$110\frac{3}{4}$ per share cost $\$25472$, 50 cts. and that $\frac{62}{230}$ of it sold for $\$5725$. Was there a gain or loss by the sale? Ans. $\$1141,50$ loss.

20. A pile of wood 84 feet 6 inches long, 22 feet 7 inches high, and 23 feet 10 inches wide, is sold at $\$3,26$ per cord, what is the amount? Ans. $\$1158,32$.

21. Required the cost of a lot of land 62 feet $11\frac{3}{4}$ inches long, and 27 feet $3\frac{1}{2}$ inches wide, at $\$1,80$ per square foot? Ans. $\$3093,86$.

22. A. of Providence has in his hands $\$500$ due to G. of Charleston, for net proceeds of his cotton, this is remitted to G. per bill on M. in his favour when bills on Charleston are at 2 per cent. discount. Required the amount of the bill? Ans. $\$510,20$.

23. Suppose $\$984,37\frac{1}{2}$ was paid in New-Orleans for a bill on New-York, when the advance was 5 per cent. what was the bill drawn for? Ans. $\$937,50$.

24. If 33865 feet of land sold in Boston in 1824 for $\$403,840,12\frac{1}{2}$ cts. how much is it per foot, and what would be the rate per acre in Federal and also in Sterling money?

Ans. $\$11,92\frac{1}{2}$ per foot,
$\$519,453$ per acre,
Equal to £116,876 18 6 ster.

25. Bo't 40 bbls. No. 3 Mackerel at $2,53¾ at 3 mo. credit.
40 " " 2 ditto - - 4,56¾ 4 " "
20 " " 1 ditto - - 6,88¼ 6 " "
20 " Mess Beef - - 9,78½ 8 " "
15 " Salmon - - - 10,66 10 " "

Required the equated time of payment, and what sum would discharge it, allowing the interest for the time as discount.

Ans. 6 months, 14 days, and $752,38.

26. A canal loan of $300,000 was taken on the following terms, viz.

| | | | | |
|---|---|---|---|---|
| 25,000 | - - | at | $102,12½ | per cent. $ |
| 25,000 | - - | - | 101,50 | " " |
| 25,000 | - - | - | 101,01½ | " " |
| 10,000 | - - | - | 100,80 | " " |
| 15,000 | - - | - | 100,70 | " " |
| 25,000 | - - | - | 100,52 | " " |
| 30,000 | - - | - | 100,31 | " " |
| 145,000 | - - | - | 100,12 | " " |
| 300,000 | | | | |

Required the average per cent. and bonus or gain to the Canal.

Ans. $100,58$\frac{1}{15}$ per cent.
Bonus or gain $1742.

27. By Ferguson's tables of specific gravities a cubic inch of pump water weighs 9,26 drams, and it is found on trial that a gallon of 231 cubic inches of cider weighs 10 oz. 10 drams more than water. What then should the liquor in a barrel of 31½ gallons weigh ? Ans. 284 lbs.

If the gallon be taken at 9 lbs. it will answer for common purposes.

28. B. and C. purchased 1200 acres of land at one dollar per acre, each paying $600. Some time after, C. on viewing it, offers to take a certain square piece at $1,75 per acre to the amount of his advance, to which B. consents. How many acres will each have, what is the length of each side of C's. lot, and what does B's. part cost him per acre ?

Ans. C. has 342 acres 3 roods 17¼ poles.
B. 857 " 0 " 22¾ "
B's. land is 70 cts. per acre.
Side of C's. = 234 rods 3 ft. 6¾ inches.

29. Three parcels of beef, of 60 barrels each, were received at Baltimore from Boston, marked, viz. W. X. Y. The lot marked W. was found to be 50 per cent. better than the others. If the whole sold together at $10 per barrel, how must the sales be adjusted between the owners of the beef?

| | | | |
|---|---|---|---|
| Ans. Y's parcel 60 bbls. at | $8,57$\frac{1}{7}$ | - | $514,28$\frac{4}{7}$ |
| X - - 60 " | 8,57$\frac{1}{7}$ | - | 514,28$\frac{4}{7}$ |
| W - - 60 " | 12,85$\frac{5}{7}$ | - | 771,42$\frac{4}{7}$ |
| 180 " | $10,00 | | $1800,00 |

30. The length of a room is 25 feet, the height 10$\frac{1}{2}$, and the width 12$\frac{1}{2}$ feet; what is the weight of the air this room contains, and also the water it would contain, supposing a cubic foot of water to weigh 1000 ounces, and air to be 800 times lighter than water?

Ans. 256 lbs. 5 oz. of Air.
205062 lbs. 8 oz. of Water.

31. If iron worth, in cash, $4 per cwt. is sold for $4,50 on a credit of 8 months, what credit should be allowed on selling wine, worth in cash $224 per pipe, but charged at $242, to make the per centage equal to that on the iron?

Ans. 5$\frac{1}{4}$ months.

32. A. bought a lot of flour for cash, and sold it to B. at an advance. B. sold it to C. at 10 per cent. advance, and C. on selling it to D. gained $71,28, equal to 12 per cent. profit; which was 4 per cent. more than A. made, though he bought it at $5 per barrel. Required B.'s gain, how much C. received, and the number of barrels in the lot?

Ans. B. gained $54,00
C. received 665,28.
In the lot, 100 barrels.

33. What would be the duty on a piece of flannel 30 yards long and 42 inches wide, if it was estimated at 40 cents per square yard, and 30 per cent. ad valorem, and what per centage would it pay on the original cost, if charged at 15*d.* sterling per yard? Ans. $4,20 duty, and 50 per cent.

34. Suppose a piece of baize 46 yards long, and 26 inches wide, estimated at 40 cts. per square yard, and 30 per cent. ad valorem, what would be the duty, and what per centage would it pay on the original cost, if charged at 27*s.* sterling?

Ans. $3,96 duty, and 66 per cent.

35. From four persons who failed in trade and compounded with their creditors, G. as creditor to each, received, viz.

From A. who paid $4\frac{138}{571}\frac{116}{231}$ shil. per £, he rec'd £117 15 2
B. - - $7\frac{138}{571}\frac{116}{231}$ " - - - - - - 176 12 9
C. - - $9\frac{104}{571}\frac{231}{861}$ " - - - - - - 235 10 4
D. - - 14*s.* $9\frac{9}{4}$*d.* $\frac{9123}{10067}$ - - - - - 353 5 6

What was the sum of *each* debt thus discharged.

Ans. £476 13 6.

36. The following lots of sugar, received per Paragon from Havana, were sold in Boston on account of sundry persons in Cuba, at $12\frac{3}{8}$ cts. per lb. Required the amount of each, allowing for draft 4 lbs. per box, and for tare 15 per cent.?

A's part 21 boxes w'g. 10794 lbs. gross, $1126,56
B. - 70 - - - 35980 - - - - - - - 3755,19
C. - 84 - - - 43176 - - - - - - - 4506,23
D. - 105 - - - 53970 - - - - - - - 5632,85

37. A's commission at 5 per cent. on a consignment of coffee was $47,50, by the gross sales of which the shipper made 25 per cent. profit. What was it invoiced at?

Ans. $760.

38. A merchant on selling certain goods on commission, charges $2\frac{1}{2}$ per cent. and $\frac{1}{4}$ per cent. for prompt payment of the net proceeds. Suppose the latter amounts to $3,00,3 mills, what was the commission? Ans. $30,80.

39. How much money at interest at 6 per cent. per annum from February 16th, 1825, would be sufficient to meet a Custom-house bond of $1464,45 which becomes due on 10th January, 1826. Ans. $1389,52$\frac{3}{4}$.

40. A merchant received on consignment three parcels of hops, viz. 450 lbs. belonging to A, 890 to B, and 510 to C. A's hops were found on inspection to be $33\frac{1}{3}$ per cent. better than the others, but it was found necessary to sell them together at 12 cts. per lb. How much do their respective sales amount to?

Ans. C's 510 lbs. at 11 cts. 1 m. $56,61
B's 890 - 11 cts. 1 m. 98,79
A's 450 - 14 cts. 8 m. 66,60

1850 at 12 cts. = $222,00

41. H. of Baltimore remits to C. in Boston for sale a set of Exchange on London, the proceeds of which to be invested in certain merchandise for his account. On selling the bill at 10 per cent. advance, C. received $8600. How much was the bill drawn for, and how much is B. to lay out for H,

so as to reserve for himself, $\frac{1}{2}$ per cent. on sale of the bill, and $2\frac{1}{2}$ per cent. commission on the investment?

Ans. The bill was £1759 1 $9\frac{9}{11}$.
For investment, $8348,29$\frac{1}{4}$.

42. A pedestrian for a wager of $1000, having engaged to travel 17 miles in 1 hour $34\frac{1}{3}$ minutes, finished 10 miles of it in 1 hour $0\frac{1}{2}$ minute, and performed the task in 1 hour 31 minutes. It is required to know whether he was before or after time when he had travelled the 10 miles, and how much was he before time when he finished.

Ans. He was 1555 yards after time at the end of 10 miles,
and 1108 " before time when he finished.

43. Suppose the town of B. to be due east of the town of A, and the town of C. due south of it at an equal distance. If the distance in a straight line from B. to C. is 196 miles, what is the distance from B. to A.? Ans. 138+ miles.

44. G. owns $\frac{3}{7}$ of $\frac{1}{2}$, and $\frac{3}{7}$ of $\frac{4}{11}$ of the other $\frac{1}{2}$ of an undivided estate in ——. Suppose this estate rents for $1556,94, being equal to 6 per cent. per annum on its value, and that he sells $\frac{1}{2}$ of his part on such terms as to yield the purchaser 8 per cent per annum on his payment, how much does G. receive, and what share has he now in the estate?

Ans. He receives $2148,37$\frac{1}{2}$, and owns $\frac{17}{154}$ths of it.

45. A merchant tailor bought 40 yards of cloth, $2\frac{1}{4}$ yards wide, but being made wet, it shrunk in length upon every 4 yards, half a quarter, and in width one nail and a half upon every $1\frac{1}{2}$ yard. To line this cloth, he bought baize 5 qrs. wide, which being wet, did shrink the whole width on every 20 yards in length, and in width it shrunk half a nail. Required the number of yards of baize used in lining the cloth? Ans. $71\frac{1}{12}$ yards.

46. Two persons brought each to market 15 bushels of Long Island pippins. B. sent his by one of the line of packets to England, for the proceeds of which the Captain at his return paid him, exclusive of freight and commission, 30 British sovereigns of £1 sterling each. C. sold his at 1 cent for the first bushel and the price to be doubled to the last. Required the proceeds of each?

Ans. 15 bushels at 1 cent, &c. $327,67.
30 sovereigns *a* $4,44$\frac{4}{9}$ 133,33$\frac{1}{3}$.

47. The circumference of the great bell at Moscow is 67 feet 4 inches, required the area of the ground it covers.

where it lodges, and the side of a square equal to the area?

Ans. 361 feet.

Side of the square = 19 feet.

48. A person being asked in the afternoon what o'clock it was, answered, that the time past from noon was equal to $\frac{1}{3}$ of the time to midnight. Required the exact time?

Ans. 5 hours 20 minutes.

Suppose the time was $\frac{1}{3}$ to midnight. Required the hour and minute? Ans. 4 hours 17$\frac{1}{7}$ minutes.

49. A. on preparing for a voyage to Calcutta purchased of G. specie dollars to be paid in 18 months with interest Supposing the premium on the dollars to be 3 per cent. and that G. would have a compensation of 5 per cent. per annum for the use of his money, to be inserted in the note, which was given for $22145, I would know the sum purchased?

Ans. $20000.

50. Two merchants, B. and C. trade together, B. advances $5000, and at the end of 4 months, being pressed for money to answer a demand, he takes out a certain sum, leaving the remainder to continue 8 months. C. advances $2500, and at the end of 5 months he finds it necessary to put in $3000 more, and continues the whole 7 months longer, when they close their business, and B. finds he has gained $1066$\frac{2}{3}$, and C. $1333$\frac{1}{3}$. I would know how much B. took out at the end of 4 months? Ans. $2400.

51. At what price per quintal should fish be rated, which is now worth in Boston 15*s*. per quintal, that on selling it at 9 months credit, there may be 15 per cent. gain, after allowing 5 per cent. discount for present payment?

Ans. 18*s*. 11$\frac{33}{190}$.

A

# PRACTICAL SYSTEM

OF

# MENSURATION AND GAUGING.

---

BY MICHAEL WALSH.

BOSTON:
CHARLES J. HENDEE.

1836.

*DISTRICT OF MASSACHUSETTS—to wit:*

DISTRICT CLERK'S OFFICE.

BE IT REMEMBERED, That on the twenty-seventh day of September, A. D. 1826, in the fifty-first year of the Independence of the United States of America, MICHAEL WALSH, of the said District, has deposited in this Office the Title of a Book, the Right whereof he claims as Proprietor, in the words following, to wit:

"A PRACTICAL SYSTEM OF MENSURATION AND GAUGING, BY MICHAEL WALSH."

In conformity to the Act of Congress of the United States, entitled, "An Act for the Encouragement of Learning, by securing the Copies of Maps, Charts, and Books, to the Authors and Proprietors of such Copies, during the times therein mentioned;" and also to an Act, entitled, "An Act supplementary to an Act, entitled, An Act for the Encouragement of Learning, by securing the Copies of Maps, Charts, and Books, to the Authors and Proprietors of such Copies, during the times therein mentioned; and extending the benefits thereof to the Arts of Designing, Engraving, and Etching Historical and other Prints."

JOHN W. DAVIS,
*Clerk of the District of Massachusetts.*

## MENSURATION.

### *BOARD AND TIMBER MEASURE.*

When the length of a board or plank is in feet, and the width in feet, multiply them for the content in feet.

When the length is in feet, and the width in inches, multiply the length by the width, and divide the product by 12 for feet.

When the length of timber or joist is in feet, and the side or sides in inches, multiply the *product* of the sides by the length, and divide by 12 for feet, board measure, or by 144 for solid or cubic feet.—If the length be taken in inches, divide by 1728 for cubic feet.

EXAMPLES.

1. In a board or plank 19 feet long, and 2 feet wide, how many feet? Ans. 38 feet.

2. In a board or plank 23 feet long, and 17 inches wide, how many feet?

```
 23
 17
---
161
 23
---
12)391
---
 32 7 Ans. 32 feet 7 inches.
```

3. How many feet in a joist, 8 inches square and 30 feet long?

```
8×8=64/12=5 4          or  8
      30                   8
     ---                  ---
     150                  64
4=1/3 10                  30
     ---                 ---
     160              12)1920
     ---              ------
                      12)160 Ans. 160 ft. board measure.
                      ------
                       13 4   or 13 ft. 4 inches solid
                              measure.
```

4. What is the content of a piece of timber, 40 feet long and the sides 18 by 21 inches?

| | | ft. | in. | | |
|---|---|---|---|---|---|
| 18 | or | 40 | 0 | at 12 | inches |
| 21 | | 20 | 0 | 6 | " |
| — | | — | | — | " |
| 18 | | 60 | 0 | 12 | " |
| 36 | | 30 | 0 | 6 | " |
| — | | 15 | 0 | 3 | " |
| 378 | | — | | | |
| 40 | Cubic feet | 105 | 0 | | |
| — | | 12 | | | |
| 12)15120 | | — | | | |
| — | | 1260 as before. | | | |
| 12)1260 feet B. M. or of Ranging timber. | | | | | |
| — | | | | | |
| Ans. 105 cubic feet. | | | | | |

5. What is the content in board measure of a joist 25 feet long, and 4 by 3 inches?

$4 \times 3 = 12$ inches or one foot, $25 \times 1 = 25$. ft. the answer. In this case the length is the content.

6. How many cubic feet in a stone, $10\frac{1}{2}$ feet long, 5 feet 3 inches wide, and 1 foot 9 inches thick?

| 5 3=63 ins. | by Duodecimals | by the quarter girt |
|---|---|---|
| 1 9=21 | 10 6 | 126 inches |
| — | 5 3 | 42 " |
| 63 | — | — |
| 126 | 52 6 | 4)168 |
| — | 2 7½ for 3 in. | — |
| 1323 | — | 42×42=1764 |
| 10½ feet | 55 1½ | 10½ |
| — | 27 6¾ for 6 in. | — |
| 13230 | 13 9¼ for 3 in. | 17640 |
| 661 | — | 882 |
| — | 96 5½ | — |
| 12)13891 | — | 12)18522 |
| — | | — |
| 12)1157 7 | | 12)1543 6 |
| — | | — |
| Ans. 96 5½ | | Feet 128 7½ |

True content 96 ft. 5½ inches.

False content 128 7½, being 32 feet too much.

7. Required the superficial feet in the following lot of boards, viz.

| *length.* | *width.* | *feet.* | *inches.* |
|---|---|---|---|
| 20 feet | 9 inches | 15 | 0 |
| 40 | 6 | 20 | 0 |
| 36 | 12 | 36 | 0 |
| 30 | 15 | 37 | 6 |
| 15 | 18 | 22 | 6 |

8. Required the content of the following pieces of timber in board measure, the length and side of the square being given.

| *length.* | *square.* | *feet.* | *inches.* |
|---|---|---|---|
| 30 feet | 8 inches | 160 | 0 |
| 30 | 9 | 202 | 6 |
| 30 | 23 | 1322 | 6 |
| 28 | 16 | 597 | 4 |

9. Required the solid content, or cubic feet in the following pieces.

| *length.* | *breadth. depth.* | *cubic ft.* | *in.* |
|---|---|---|---|
| 7 feet 5 inches | 41 by 29 inches | Ans. 61 | 2 |
| 24 " | 18 by 14 " | 42 | 0 |
| 30 " | 18 by 15 " | 56 | 3 |
| 9 " | 45 by 13 " | 36 | $6\frac{3}{4}$ |

10. How many cubic feet in 4 stones, measuring, viz.

| *length.* | | *cubic ft.* | *in.* |
|---|---|---|---|
| 10 feet | 21 by 18 inches | 26 | 3 |
| 10 " | 22 by 15 " | 22 | 11 |
| $4\frac{1}{2}$ " | 35 by $16\frac{1}{2}$ " | 18 | 0 |
| $9\frac{1}{2}$ " | 19 by $12\frac{1}{2}$ " | 15 | 8 |

## *ROUND TIMBER.*

To find how much round timber will square to. Multiply the girt by ,225 : or multiply the diameter by ,7, or ,71.

To find the girt or circumference by the diameter. Say—As 1 is to 3,14159, or 3,14, or as 7 to 22, so is the diameter to the girt ; and the reverse to find the diameter from the circumference.

To find the quarter girt, take $\frac{1}{4}$ of the circumference. Deducting $\frac{1}{7}$ from the diameter will also give the quarter girt, nearly.

EXAMPLE.

Suppose a round stick to be 24 inches diameter, how much will it square to? Ans. 17 inches.
" " is the girt? - - - - 75½ "
" " the quarter girt? - - - 18¾ "

Round timber loses almost ⅓ of its solidity by being squared, and the quarter girt makes about ¼ more than the side of the square would. The solid content being to that by the quarter girt as 9 to 7, and to the content, if squared, as 30 to 19.

*To find the Cubic Feet in Round Timber.*

RULE. Multiply the square of the girt by the length, from the product reject two figures to the right, and divide the remaining figures by 18, or more concisely by 3, and then by 6 for cubic feet. If by custom or agreement the quarter girt is taken, multiply the square of it by the length in feet, and divide by 144 for the content in cubic feet.

EXAMPLES.

1. Required the content of a round log, the girt of which is 80 inches, and the length 26 feet.

by the girt 80 quarter=20 inc. 80×,225=18 in. for side of the square.

| | | |
|---|---|---|
| 80 | 20 | 18 |
| 6400 | 400 | 144 |
| 26 feet | 26 feet | 18 |
| 38400 | 12)10400 | 324 |
| 12800 | | 26 feet |
| 3)1664,00 | 12)866,8 | 12)8424 |
| 6)554 | cub.ft.72,2⅔ by ¼ girt. | 12)702 |
| Ans. 92 feet. | | cub. ft. 58,6 if squared. |

2. Required the contents of the following pieces of round timber, viz.

| *length.* | *girt.* | *solid content, by ¼ girt, if sq.* | cubic ft. |
|---|---|---|---|
| 20 feet | 48 inches - - - | Ans. 25½ ft. | 20 - 16½ |
| 28 " | 52 " - - - - - | 42 " | 32 - 27 |
| 25 " | 60 " - - - - - | 50 " | 39 - 31½ |
| 24 " | 70 " - - - - - | 65 " | 51 - 41 |
| 30 " | 52 the mean of 5 diff. places | 45 " | 35 - 28½ |
| 20 " | the diameter being 24 inches | 62½ " | 49 - 40 |

Suppose the six pieces, last mentioned, were pine logs, brought by A. to a saw-mill, and when measured at the quar-

ter girt, he sold them at $9 per thousand: Allowing as usual 115 feet to make a thousand feet of boards, and deducting one fourth for sawing, what was the amount?

115 : 1000 : : 226 the contents as before.
1000

115)226000

1965 feet of boards.

| | | | |
|---|---|---|---|
| | 1965 | Or, 1965 | |
| | 9 mills. | $\frac{1}{4} = 491$ | deducted. |
| | 17685 | 1474 | feet. |
| $\frac{1}{4}$ | 4421 | 9 | mills. |
| Amount | $13,26,4 | $13,26,6 | |

8. Required the difference in the solid contents of the two following pieces of timber, equal in length and circumference, viz.

One *round* piece, 24 feet long, and 60 inches in circumference. The other piece 24 feet long, 18 inches wide and 12 inches thick.

Ans. 12 feet, the first being 48, and the other 36 cubic ft

This *difference* accounts for the custom in N. England of paying one-third *more* for the hauling round timber from the forests to the ship-yards, than for that which is rough-hewn; each being taken there at the quarter girt.

## *RULES FOR PILLARS.*

1. Multiply the square of $\frac{2}{3}$ of the girt by twice the length in feet, and divide by 144 for the content.

2. Multiply $\frac{1}{2}$ of the circumference by $\frac{1}{2}$ of the diameter, and the product by the length in feet, and divide the last product by 144 for the answer.

3 Multiply the square of the diameter by the length in feet, and that product by 11, and then divide by 14 for the solid content in feet.

EXAMPLE.

Required the content in cubic feet of a pillar, the diameter of which is 30 inches, equal to 94 inches girt, and the length 24 feet.

| *1st. method.* | *2d.* | *3d.* |
|---|---|---|
| $\frac{1}{3}$ of 94 = 18$\frac{1}{3}$ | $\frac{1}{2}$ of 94 = 47 | diam. 2$\frac{1}{2}$ × 2$\frac{1}{2}$ = 6$\frac{1}{4}$ ft. |
| 18$\frac{1}{3}$ | $\frac{1}{2}$ of 30 = 15 | 24 |
| 353 | 705 | 150 |
| 24 × 2 = 48 | 24 | 11 |
| 12)16944 | 12)16920 | 14)1650 |
| 12)1412 | 12)1410 | 117 10 |
| 117 8 | 117 6 | |

To find the content of round or unsquared timber, whose ends or bases are unequal in circumference.

RULE. To the products of the girts of the two bases, add $\frac{1}{3}$ of the square of the difference, the sum will be the square of the mean girt, then proceed as before.

EXAMPLE.

Required the solidity of a mast, the length of which is 72 feet, and the girt at one end is 57 inches, and at the other 38 inches.

57 × 38 = 2166
38
—
19 × 19 = 361 ÷ 3 = 120
—
2286
72
—
4572
16002
—
3)1645,92
—
6)548
—
Ans. 91 feet

## CIRCLES.

To find the area of a circle from its circumference. Multiply its square by ,07958. And to find its area by the diameter, multiply its square by ,7854.

To find the side of a square equal to any given superficies.

RULE. The square root of the given area is the side equired.

If the diameters of circles be as 1 to 2, the circumferences will be in the same proportion. But the areas of the same circles will be as 1 to 4, or as the squares of their diameters. Therefore, while the circumference is twice as large, the area is four times as much.

---

## SPHERES OR GLOBES.

The superfices of every sphere or globe is equal to four times the area of its greatest circle. Multiplying its diameter by its circumference will also give its convex surface.

*To find the solidity of a Sphere or Globe.*

Multiply the cube of its axis by ,5236.

Spheres are to each other as the cubes of their diameters; and their surfaces as the squares of their diameters.

## GAUGING.

GAUGING teaches to find the content of any vessel by having the proper dimensions given, which are usually taken in inches and tenths of an inch.

| | |
|---|---|
| An Ale gallon contains - - | 282 Cubic inches. |
| A Wine gallon - - - | 231 |
| Bushel - - - - | 2150,42 |
| Cubic Foot - - | 1728 |

The Ale gallon is to the Wine gallon as 58 to 71 nearly.

## Problem I.

*To find the content in Ale or Wine gallons, &c. of a box, chest, or cistern.*

Rule. Multiply the length, breadth, and depth together, and divide the last product by the cubic inches in a gallon or bushel, and the quotient will be the answer required.

### Examples.

1. Required the content in ale gallons, of a square vessel, the sides of which are 80 inches and the depth 20 inches?

$80 \times 80 = 6400 \times 20 = 128000 \div 282 = 454$ Ale gallons.

2. How may bushels in a cistern 8 feet long, 4 feet wide, and 4 feet deep, equal to a cord, wood measure?

$96 \times 48 \times 48 = 221184$ cubic inches, and divided by 2150,42, the cubic inches in a bushel, give $102\frac{4}{5}$ *even* bushels.*

Or thus,

8 feet (*Cubic foot.*) $\times 4 \times 4 =$ 128

One bushel $= 1\frac{1}{4}$ 4

4

5 )512

$102\frac{4}{5}$ *even* bushels.

## Problem II.

*To find the contents of a vessel in form of a part of a pyramid.*

Rule. Multiply the sides of the two bases together, and to the product add $\frac{1}{3}$ of the square of their difference; then multiply the sum by the height, and divide the product by the cubic inches in the measure required.

### Example.

Required the contents in wine gallons of a vessel in form of a part of a pyramid that has the sides of the base 96

* The difference between *heaped* and *even* bushels, in measuring loads of charcoal, does not appear to be fixed.

s, and the sides at the top 68 inches, and the height 81 s?

$96 \times 68 = 6528$
$261\frac{1}{3}$
$6789\frac{1}{3}$
81
6789
54312
27
231)549936

96
68
28
28
$\frac{1}{3})784$
$261\frac{1}{3}$

Ans. 2380,6 W. gallons.

2150,42)549936

Equal to 2,55,7 Bushels.

the area of a circle whose diameter is 1 inch, is ,7854 al parts of an inch, if the contents of a gallon or bushel ided by ,7854 the quotient will be the proper divisor e square of any diameter, to reduce the cubic inches allons or bushels, and the square root of this divisor is he gauge point, and the fixed multipliers, which an- the same purpose, are found by dividing ,7854 by the nts of the gallon, bushel, cubic foot, or any other mea- the quotient being the multiplier required. Thus,

| r. | Dividend. | | For fixed Divisors. | | |
|---|---|---|---|---|---|
| 1 | 282 | Quotient | 359,05 | Gauge point | 18,95 for Ale gals. |
| 1 | 231 | - - - | 294,12 | - - - - - | 17,15 " Wine. |
| 1 | 2150,42 | - - - | 2738 | - - - - - | 52,32 " Bushels. |
| 1 | 1728 | - - - | 2200 | - - - - - | 46,9 " Cubic ft |

| Divisor | | Dividend. | Fixed Multipliers. | |
|---|---|---|---|---|
| gallon | 282 C. In. | ,7854 | the quotient is | ,002785 for Ale gals. |
| e | 231 | ,7854 | - - - - - | ,0034 " Wine. |
| el | 2150,42 | ,7854 | - - - - - | ,000365 " Bushels. |
| c ft. | 1728 | ,7854 | - - - - - | ,000454 " Cubic ft. |

## Problem III.

*To find the content of a cylinder in Gallons, &c.*

ILE. Multiply the square of the diameter by the length, hen multiply or divide by the proper numbers.

EXAMPLES.

1. Required the content in wine gallons of a cylinder, the diameter of which is 42,5 inches, and its length 31,5 inches?

$42{,}5 \times 42{,}5 = 1806{,}25$

$31\frac{1}{2}$

56896,87

,0034

193,449358 Ans. $193\frac{1}{2}$ W. gals.

Or thus: 294)56896

$193\frac{1}{2}$ gallons, as before.

5689

For Ale gallons, $\frac{}{359} = 158{,}5$ gallons.

2. The tube of Dr. Herschel's great telescope is forty feet in length and five feet in diameter.* Required the contents in wine gallons of a cylinder of equal dimensions.

$60 \times 60 = 3600$

480

1728000

,0034

5875,2000 Ans. 5875 W. gals.

3. What is the content in English bushels of a measure in form of a cylinder, the diameter of which is 19 inches and the height $17\frac{1}{2}$ inches?

$19 \times 19 = 361$

$17\frac{1}{2}$

2527

361

180

6317

,000365

31585

37902

18951

Bushels 2,305705

Or,

2738)6317(2,3

5476

841,0

8214

196

Ans. 2,3 bushels.

* Silliman.

4. Suppose a round tub to be 45 inches diameter, and one inch deep, what is its content in ale gallons?

$$\frac{45\times45=2025}{359}=5{,}64 \text{ gallons.}$$

If the square of the diameter of any circle be multiplied by ,7854 the product is the area.

EXAMPLE.

If the diameter of a circle be 45 inches, what is the area?

$45\times45=2025\times,7854=1590$ inches,

and at one inch deep the content or capacity would be 1590 inches, which when divided by 282 would give

5,63 Ale gallons, nearly, as before.

## PROBLEM IV.

*To find the content of a cask or round vessel, that is straight staved and wider at one end than at the other.*

RULE. To the product of the two diameters, add $\frac{1}{3}$ of the square of their difference, then multiply the sum by the length, this product multiplied by the proper factor, or divided by the divisor, will give the content required.

EXAMPLE.

Required the content in wine gallons of a round vessel, the bottom of which is 38, the top 20,2 inches diameter, and the length 21 inches.

| | |
|---|---|
| $38\times20,2=767,6$ | 38 |
| 105,6 | 20,2 |
| 873,2 | 17,8 |
| 21 | 17,8 |
| 18337,2 | $\frac{1}{3})316,84$ |
| ,0034 | |
| 62,34648 | 105,61 |

Ans. 62 Wine gallons.

359)18337 ( 51 Ale gallons
1795
387
359
28

## Problem V.

*To find the content of a cask, having the bung and head diameters, and the length given.*

Rule. Multiply the difference between the head and bung diameters by ,68, ,67, ,64, ,62, or ,55 or such number as belongs to the form of the cask, add the product to the head diameter, and the sum will be the mean diameter, and then proceed as for a cylinder.

### Example.

Given the bung diameter 28 inches, the head 20, and the length 40 inches. Required the contents, using ,68 for a multiplier, as the cask was full on the quarter.

| | | |
|---|---|---|
| 28 | 20 | |
| 20 | 5,44 | |
| 8 | 25,44×25,44=647,1936 | |
| ,68 | | |
| 5,44 | 647,2×40=25888 | |
| | ,0031 | |
| | 103552 | Ans. 88 Wine gallons. |
| | 77664 | |
| | 88,0192 | " 72 Ale gallons." |

It is not so much the difference between the head and bung diameters, as the curvature of the cask that is to be regarded in choosing a multiplier. The greater the curvature, the greater should be the multiplier, and the nearer it is to a straight staved form, the less will be the multiplier. But by a little practice a person can tell at sight of a cask, what multiplier is to be used to find the contents.

*To gauge a cask by means of the line of numbers on Gunter's scale, or on the callipers used by gaugers.*

Rule. Extend from 1 towards the left hand to the number chosen as a multiplier, that extent will reach from the difference between the bung and head diameters to a number which, being added to the head diameter, will give the mean diameter, that is, will reduce the cask to a cylinder.

Then put one foot of the compasses upon the gauge point for the name required, and extend the other to the mean diameter, this extent turned over twice the same way from the length of the cask, will give the contents.

In the preceding example the extent from 1 to ,68, will reach from 8 to 5,44, which added to 20, gives 25,44 for the mean diameter. Then the extent from 17,15, the gauge point for wine gallons, turned over twice from the length 40, will reach to 88 gallons.

The same case on the Sliding Rule, using ,7 as a multiplier. Set 1 on the sliding line against ,7, and against 8 on it is 5,6 which added to 20 inches gives 25,6 for the mean diameter. Then set 17,15, the gauge point on the slide, against 15,1 and then against 40 on the slide line is 59,7, and against 59,7 on the slide, is 89,2, the contents in wine gallons.

Dimensions of Casks, the contents of which are to be found by the preceding rules.

| *head.* | *bung.* | *length.* | *multiplier.* | *M. D.* | *contents.* Wine gals. |
|---|---|---|---|---|---|
| 27,6 Inches | 33,6 | 38 | ,67 | 31,62 | 129 |
| 25,6 | 33,8 | 52,3 | ,64 | 30,85 | 169 |
| 25,1 | 27,2 | 30 | ,6 | 26,36 | 70 |
| 30,7 | 34,5 | 59 | ,62* | 33,1 | 219 |
| 23 | 26,5 | 28 | ,68 | 25,4 | 62 |
| 23 | 26,5 | 28 | ,5 | 24,75 | 59 |
| 24,5 | 31,5 | 42 | ,7 | 29,4 | 123 |
| 24,5 | 31,5 | 42 | ,64* | 28,98 | 120 |
| 24,5 | 31,5 | 42 | ,52 | 28,14 | 113 |
| 24,5 | 31,5 | 42 | ,57 | 28,49 | 116 |
| | | | | | Ale gals. |
| 24,5 | as before | " | ,7 | 29,4 | 101 |
| 24,5 | " " | " | ,65 | 29,05 | 98,7 |
| 24,5 | " " | " | ,6 | 28,7 | 96 |
| 24,5 | " " | " | ,55 | 28,35 | 94 |

* 62 and 64 are the numbers generally used,

## EXCHANGE.

**Exchange** is the paying of money in one place or country, for the like value to be received in another place or country.

There are two kinds of money, viz. *real*, and *imaginary*.

*Real money* is a piece of metal coined by the authority of the state, and current at a certain price, by virtue of the said authority, or of its own intrinsic value.

*Imaginary money* is a denomination used to express a sum of money of which there is no real species, as a *livre* in France, a *pound* in America, because there is no specie current, in this or that country, precisely the value of either of the sums.

*Par of Exchange* is the intrinsic value of the money of one country compared with that of another country, as one pound sterling is equal to $4,44$^{1}$ cents; and a bill of £153 sterling at par, would be valued at $680 in the United States.

*Course of Exchange* is the current or running price of exchange, which is sometimes above, and sometimes below par, varying according to the occurrences of trade, or demand for money. Thus—when the course of exchange is 10 per cent. advance, or in favour of London, the £ sterling is valued at $4,88$^{8}$ cents, and a bill of £153 is worth $748; but if at 10 per cent. discount, the £ is then equal to $4, and the same bill is worth but $612.

In the latter case, the exchange is in favour of this country, in the former against it.

### *UNITED STATES.*

The money of account is the dollar of 100 cents.

The standard quality of silver, on which the currency is based, is 10 oz. 14 dwts. $4\frac{5}{11}$ grs. fine in 12 ounces. An ounce of which is worth $115\frac{5}{11}$ cents. The weight of the dollar is 17 dwts. 8 grs. equal to 416 grs.

An ounce of standard gold is worth $17,71 cts. or 27 grs. for a dollar.

When gold or silver is below standard, the expense of refining is from five to six cents per ounce. If silver is above standard, the alloy is paid for. The value of the precious metals can be ascertained and established in all cases, only by the Assayer of the Mint.

In regulating the value of our own and foreign coins, our laws have fixed the value of one ounce of gold at fifteen of silver. But throughout commercial Europe, gold is valued

4. Suppose a round tub to be 45 inches diameter, and one inch deep, what is its content in ale gallons?

$$\frac{45\times45=2025}{359}=5{,}64 \text{ gallons.}$$

If the square of the diameter of any circle be multiplied by ,7854 the product is the area.

EXAMPLE.

If the diameter of a circle be 45 inches, what is the area?

$45\times45=2025\times,7854=1590$ inches,

and at one inch deep the content or capacity would be 1590 inches, which when divided by 282 would give

5,63 Ale gallons, nearly, as before.

## PROBLEM IV.

*To find the content of a cask or round vessel, that is straight staved and wider at one end than at the other.*

RULE. To the product of the two diameters, add $\frac{1}{3}$ of the square of their difference, then multiply the sum by the length, this product multiplied by the proper factor, or divided by the divisor, will give the content required.

EXAMPLE.

Required the content in wine gallons of a round vessel, the bottom of which is 38, the top 20,2 inches diameter, and the length 21 inches.

| | |
|---|---|
| $38\times20,2=767,6$ | 38 |
| 105,6 | 20,2 |
| 873,2 | 17,8 |
| 21 | 17,8 |
| 18337,2 | $\frac{1}{3})316,84$ |
| ,0034 | |
| 62,34648 | 105,61 |

Ans. 62 Wine gallons.

359)18337 ( 51 Ale gallons
1795
387
359
28

## GREAT BRITAIN.

The money of account is in pounds, shillings, pence, and farthings. The principal coins are the guinea and its parts, and the crown and its parts.

The pound sterling or sovereign is to the United States dollar of 4*s*. 6*d*. sterling, as - - - 9 to 40
The guinea of 21 shillings - - - - 1 " 4⅔
The crown of 5 " - - - - 9 " 10
The shilling - - - - - - 9 " 2
Pence to cents - - - - - 2 " 50

| | *N. E. & V.* | *N. Y. & N. C.* | *P. N. J. D. & Md.* | *S. C. & G.* | *Canada & N. S.* | *Newfoundland.* | *Fed. money.* |
|---|---|---|---|---|---|---|---|
| £9 sterling = | £12 | 16 | 15 | 9⅓ | 10 | 9 | $40 |

## COINAGE OF 1817.

| | | | *oz.* | *dwt.* | *grs.* |
|---|---|---|---|---|---|
| *Gold Coins.* | Half sovereign of 10*s*. | weighing | 0 | 2 | 13,6+ |
| | Sovereign 20*s*. or £1 | " | 0 | 5 | 3,2+ |
| | Double sovereign 40*s*. or £2 | " | 0 | 10 | 6,5 |
| | 5 sovereign piece 100*s*. or £5 | " | 1 | 5 | 16,3+ |

An ounce of standard gold, on which the currency is based, is worth - - - - - £3 17 10½
An ounce of standard silver is worth - - 0 5 2
A *plum* in British money is - - - £100,000.

*British Stocks, or Public Funds. February* 16.

The prices of British stocks, &c. are stated in the lists that are daily published, as follows:

1. Bank Stock - - 226
2. 3 per cent Consols - - 63¼ - 64¾ ⅛
3. Bank Long Annuities - 16⅛ - 1——16
4. Exchequer Bills - - 2 - 3
5. India Bonds - - 1 pr. 2 discount.
6. Omnium - - - 3¾ premium.
7. Consols for Feb. 25 - 62½

1 Signifies that £226 is given on that day for £100 bank stock.

2 Signifies that the value of £100 of this kind of stock sold on the day this price was quoted, for £63 5*s*. at the beginning of the market, and that it rose to £64 15, and left off at £64 10.

3 Signifies that the annual payment of these annuities was worth $16\frac{1}{8}$ years' purchase at the beginning, and left off at $16\frac{1}{16}$ years' purchase, at the close of the market.

4 Signifies that every £100 in exchequer bills bore a premium of 2 shillings at the beginning, which advanced to 3 shillings at the end of the day.

5 Signifies that every £100 of India bonds sold at first at 1 shilling premium, and afterwards sold at 2 shillings discount.

6 Signifies that omnium sold for a premium of £3 15.

*Consols* are produced by above 400 millions of stock, in part formed by the consolidation of several stocks, bearing an interest of 3 per cent. When the word consols is indefinitely used, it is always understood to mean these annuities. The 4 per cents. are formed by a similar consolidation of 50 millions of government stocks. The reason, that the 3 per cents. reduced, when mentioned, are quoted higher than the 3 per cents. consols, is, that there is more interest due on the former than on the latter; that is, the half year's interest on the reduced, is due on Lady day, or 25th of March, but on the consols, not till midsummer.

*Omnium* is a term denoting the different stocks formed by a loan, while any part of the loan remains unpaid. For example, suppose 50 millions of money are to be raised, and for every £100 in money are to be given £100 stock in 3 per cents. £50 stocks in the 4 per cents. and 6*s.* 3*d.* per cent. in the long annuities, payable in 1860: then if any person engage to advance £10,000 in money—upon paying the first instalment, (for the money is usually advanced at the rate of 10 per cent. per month, until the whole is paid) he will receive three receipts, which separately contain an engagement to tranfer to the person possessing them £10,000 stock in the 3 per cents. £5000 stock in the 4 per cents, and £31 10 stock in the long annuities, &c. upon the whole of the instalments being paid at or before the appointed time. While these three receipts are sold together, and before the whole of the instalments being paid, they are called *omnium*, as they are made up of all, or several of the stocks.

*Scrip* is a term given to each of the omnium, when sold separately.

When the stock created by any loan is formed, in only one sort of stock, there is, properly speaking, no *omnium*, though there by a misnomer, the scrip receipt is called by that name.

7 Shows that some persons had bought stock in anticipa-

tion, and agreed to give for it on the day mentioned at the rate of £62 10 per cent.

1. What is the value of a bill of £786 17 6 sterling, at 8 per cent. advance?

786,875
40

9)31475,000

3497,222
Add 8 per cent. 279,778

Ans. $377,000

2. Suppose $600 be invested in a bill on London, when the exchange is 10 per cent. advance, what is the amount in sterling.

600
9

40)5400

£135
deduct $\frac{1}{11}$ 12 5 5½

Ans. £122 14 6½

As the Ex. is $\frac{1}{11}$ of 100, deducting $\frac{1}{11}$ from the par value gives the answer.

3. Invest $563,70 in a bill on London, when the exchange is 9 per cent. advance.

109 : 100 :: 563,70 : 517,15

$517,15×9=4654,35

$\frac{4654,35}{40}$ = £116 7 2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| £750 | 14 | 6 | ster. | at 5 | per cent. | adv. | - | - | $3503,38 |
| 114 | 18 | 5 | " | 2½ | " | disct. | - | - | 497,99 |
| 179 | 0 | 0 | " | 9¼ | " | adv. | - | - | 869,14 |
| 211 | 15 | 9 | " | 10¼ | " | " | - | - | 1040,11 |
| 783 | 11 | 11 | " | 10¾ | " | " | - | - | 3857,03 |

When the British merchant in his interest account allows 3 per cent. for deposits, he rejects $\frac{3}{5}$ths of the products of time and money, and considers the remainder as products at 5 per cent. which is equal to 1 shilling per £ for 365 days.

EXAMPLE.

1. Suppose the balance of products to be 107408, what is the interest at 8 per.cent. ?

107408
off $\frac{1}{2}$ 42963

365)64445

176*s*. $6\frac{3}{4}d$.

Ans. £8 17 $6\frac{3}{4}$.

What is the premium of insuring £20 at 30*s*. per cent.

Ans. 6 shillings.

What is the value of $16740,55, American 3 per cent. stock, sold in London at 55 per cent. ?

16740,55
at 50 8370,27.5
5 837,02.7
9207,30.2
9
40)82865,718
2071,642.9
20
12,8580
12
10,2960

Ans. £2071 12 10.

Required the standard weight in London of United States' eagles, weighing, before melting, 225 oz. 7 dwt. 12 grs. deducting $\frac{1}{2}$ grain worse than standard, equal to an inferiority of $\frac{1}{2}$ grain in 22 carats of 4 grs each, from British standard.

22
4
88 · $\frac{1}{2}$ :: 225 7 12
108180 grs.
88)54090
24)614$\frac{1}{2}$ grs.
20)25 14$\frac{1}{2}$
1 5

Ans. 1 oz. 5 dwt. 14$\frac{1}{2}$ grs.

*Account of sales of United States' eagles, with the allowances, deductions, and charges, from Liverpool to London.*

| | | Oz. | dwt. | grs. | | | |
|---|---|---|---|---|---|---|---|
| The eagles weighing, before melting, | | 859 | 8 | 0 | | | |
| After melting into five bars | 857 19 12 | | | | | | |
| Dross retained by melters, | 0 17 12 | | | | | | |
| | | 858 | 17 | 0 | | | |
| Loss by melting, | | 0 | 11 | 0 | | | |
| Allowed for dross, | | | | | £3 | 7 | 9 |
| 4 bars, weighing | 676 2 12 | | | | | | |
| Deduct, being ½ a grain worse than standard, | 3 16 20 | | | | | | |
| | | 672 | 5 | 16 | | | |
| 1 bar, weighing | 181 17 0 | | | | | | |
| Deduct, being ¼ of a grain worse than standard, | 0 10 8 | | | | | | |
| | | 181 | 6 | 16 | | | |
| Standard, | | 853 | 12 | 8 | | | |
| £3 17 10½ per oz. | | | | | 3323 | 15 | 4 |
| Sterling, | | | | | £3327 | 3 | 1 |

*Charges.*

| | | | |
|---|---|---|---|
| Carriage from Liverpool to London, | £0 | 14 | 9 |
| Proportion of Mr. M's expenses for taking charge of the gold to London, | 3 | 15 | 0 |
| Coach hire to refiners, | 0 | 2 | 0 |
| Melting 71 lbs. at 8*d*., £2 7*s*. 4*d*. dr. money, 1*s*. | 2 | 8 | 4 |
| Assaying, 25*s*. 6*d*. bank porters, 2*s*. 6*d*. | 1 | 8 | 0 |
| Commissions on £3327 3*s*. 1*d*. at ¼ pr. ct. | 8 | 6 | 4 |
| | | 16 | 14 5 |
| *London, Sept. 21st.* 1821. | £3310 | 8 | 8 |

*A Statement of actual sales of Silver.*

Shipment from Baltimore to Liverpool—

| | | | | |
|---|---|---|---|---|
| 76,000 Spanish South American dollars, weighing | 65822 *oz.* | 10 *dwt.* | 10 *grs.* | |
| at 58 1-8*d*. per ounce, | £15941 | 7 | 8 | |
| Charges, not including insurance, | 113 | 0 | 0 | |
| Net proceeds, | | | | £15828 7 8 |
| Which, at 8-45 per cer cent. premium on bills, is | | | | $76292 80 |
| $76,000 cost, premium 3-8ths per cent. | | | | $76285 00 |

| | | | | |
|---|---|---|---|---|
| $24,000, in half dollars, United States coinage, direct from the U. S. Mint, weighing 20813 *oz.* at 57 7-8*d*. | £5018 | 19 | 4 | |
| Charges, not including insurance, | 35 | 0 | 0 | |
| Net proceeds, | | | | £4983 19 4 |
| Which, at 8-35 per cent premium on bills, is | | | | $24000 56 |

*Calculations of Actual Sales of British Goods in United States.*

| | | £ | s. | d. | | | | $ cts. |
|---|---|---|---|---|---|---|---|---|
| 1. | Sterling | 53 | 11 | 6 | at | 75 per ct. advance | Ans. | 416,69 |
| 2. | | 46 | 12 | 6 | at | 33⅓ " - | - | 276,29 |
| 3. | | 81 | 6 | 8 | at | $5 per £ sterling | - | 406,67 |
| 4. | | 73 | 17 | 6 | at | 4⅓ - - - | - | 360,14 |
| 5. | | 97 | 18 | 6 | at | 4,06 - - | - | 397,57 |
| 6. | | 149 | 6 | 8 | at | par - - | - | 663,70 |
| 7. | | 107 | 6 | 11 | at | 17½ per ct. advance | - | 560,58 |
| 8. | | 864 | 0 | 0 | at | 23⅜ " discount | - | 3748,80 |
| 9. | | 281 | 13 | 5 | at | 12½ " " | - | 1095,39 |
| 10. | | 113 | 12 | 10 | at | 18¾ " advance | - | 599,77 |
| 11. | | 158 | 13 | 0 | at | $4,15 cts. per £ sterling | | 658,39 |

*A TABLE for reducing Sterling to Federal Money at par.*

| £ | $ cts. ms. | s. | $ cts. ms. | pence. | cts. ms. |
|---|---|---|---|---|---|
| 1000 - | 4444 44 4 | 19 - | 4 22 2 | 11 - | 20 4 |
| 900 - | 4000 00 0 | 18 - | 4 00 0 | 10 - | 18 5 |
| 800 - | 3555 55 5 | 17 - | 3 77 7 | 9 - | 16 7 |
| 700 - | 3111 11 1 | 16 - | 3 55 5 | 8 - | 14 8 |
| 600 - | 2666 66 6 | 15 - | 3 33 3 | 7 - | 13 0 |
| 500 - | 2222 22 2 | 14 - | 3 11 1 | 6 - | 11 1 |
| 400 - | 1777 77 7 | 13 - | 2 88 8 | 5 - | 9 3 |
| 300 - | 1333 33 3 | 12 - | 2 66 6 | 4 - | 7 4 |
| 200 - | 888 88 8 | 11 - | 2 44 4 | 3 - | 5 5 |
| 100 - | 444 44 4 | 10 - | 2 22 2 | 2 - | 3 7 |
| 90 - | 400 00 0 | 9 - | 2 00 0 | 1 - | 1 8 |
| 80 - | 355 55 5 | 8 - | 1 77 7 | ¾ - | 1 4 |
| 70 - | 311 11 1 | 7 - | 1 55 5 | ½ - | 0 9⅓ |
| 60 - | 266 66 6 | 6 - | 1 33 3 | ¼ - | 0 4½ |
| 50 - | 222 22 2 | 5 - | 1 11 1 | | |
| 40 - | 177 77 7 | 4 - | 0 88 8 | | |
| 30 - | 133 33 3 | 3 - | 0 66 6 | | |
| 20 - | 88 88 8 | 2 - | 0 44 4 | | |
| 10 - | 44 44 4 | 1 - | 0 22 2 | | |
| 9 - | 40 00 0 | | | | |
| 8 - | 35 55 5 | | | | |
| 7 - | 31 11 1 | | | | |
| 6 - | 26 66 6 | | | | |
| 5 - | 22 22 2 | | | | |
| 4 - | 17 77 7 | | | | |
| 3 - | 13 33 3 | | | | |
| 2 - | 8 88 8 | | | | |
| 1 - | 4 44 4 | | | | |

USE OF THE TABLE.

Reduce £987 13 9¾ sterling to Federal Money.

| | | Proof. |
|---|---|---|
| £900 - - | $4000,00,0 | £987 13 9¾ |
| 80 - - - | 355,55,5 | |
| 7 - - - | 31,11,1 | |
| 13s. - - - | 2,88,8 | 987,691 |
| 9d. - - | 0,16,7 | 40 |
| ¾d. - | 0,01,4 | |
| | | 9)39507640 |
| | $4389,73,5 | |
| | | $4389,73,7 |

A merchant receives from Liverpool a parcel of goods, and marks them for sale at the following rates: Required the selling price in Federal Money?

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 18s. | 8d | ster. | at par | | $3,04 | 11s. | 9d. | at 33⅓ | per ct. adv. | $3,46 |
| 5 | 10 | " | 10 | pr. ct. adv. | 1,42 | 2 | 4 | 40 | " | 72 |
| 8 | 4 | " | 12½ | " | 83 | 32 | 3 | 50 | " | 10,75 |
| 6 | 1½ | " | 15⅜ | " | 1,57 | 27 | 9 | 60 | " | 9,88 |
| 17 | 0⅜ | " | 17½ | " | 4,44 | 34 | 11 | 75 | " | 13,98 |
| 33 | 1 | " | 20⅜ | " | 8,82 | 12 | 3 | 100 | " | 5,61 |
| 1 | 2 | " | 25 | " | 33 | 55 | 0 | 10 | discount | 11,99 |
| 18 | 10 | " | 30 | " | 5,44 | 83 | 3 | 25 | " | 13,98 |

## *IRELAND.*

The money of account as in England, but different in value. The par between England and Ireland, is 8⅓ per cent. that is, £100 sterling money is £108 6 8 in Ireland.

The United States dollar is equal 4*s.* 10½*d.* Irish.

The English guinea is equal to 22*s.* 9*d.* Irish.

After the 5th of January, 1826, the New Act assimilating the Irish and English currency commenced. All Invoices, Contracts, &c. will be considered there in point of law, British currency, *unless* expressed to the contrary.

## *HAMBURGH.*

Accounts are kept in Hamburgh in Marks, shillings Lubs or Stivers, and Deniers.

12 deniers, or 2 grotes make 1 shilling lubs, or stiver.

16 shillings lubs, stivers, or 32 grotes - - - - } 1 mark.

ALSO,

12 grotes or pence Flemish make 1 shilling Flemish.

20 shillings Flemish - - 1 pound.

NOTE. 3 marks - - make 1 rix dollar.

7½ do. - - - 1 pound Flemish.

A shippound in Hamburgh 280 lbs.

A ring of staves do. 240

100 lbs. in Hamburgh - 107½ in U. States.

100 ells do. - - 62½ yards.

The currency of Hamburgh is inferior to the bank money; the *agio*, or rate, is variable; May 14th, 1798, it was 20 per cent. in favor of the bank.

The mark banco is 33⅓ cents; (See laws of the U. States.)

## *HOLLAND.*

Accounts are kept in Florins or Gilders, Stivers, Deniers or Pennings.

| | | | |
|---|---|---|---|
| 8 | pennings | make | 1 grote. |
| 2 | grotes, or 16 pennings | - - - | 1 stiver. |
| 20 | stivers, or 40 grotes | - - - - | 1 gilder or florin. |

ALSO,

| | | | |
|---|---|---|---|
| 12 | grotes, or 6 stivers | - - - - | 1 shilling. |
| 20 | shillings, or 6 gilders | - - - | 1 pound Flemish. |
| 2½ | florins | - - - - - - - - - | 1 rix dollar. |

The florin or gilder of the United Netherlands is estimated in the United States at 40 cents, or 2 cents per stiver.

100 lb. in Amsterdam make 109½ lb. in the U. States.
109 ells do. - - - 75 yards do.

In liquid measure, 16 mingles make 1 steckan, 8 steckans 1 aum. = 41 gallons.

*To change Sterling to Flemish.*

RULE. As 1 pound sterling is to the given rate, so is the sterling given to the Flemish required.

*To change Flemish to Sterling.*

RULE. As the given rate is to £1 sterling, so is the Flemish given to the sterling required.

The Old Bank of Amsterdam having ceased to exist on the first of February, 1820, all payments are now made in *Current Money*, and the *Agio* which formerly existed between Bank and Current was on that day abolished.

A new system of moneys, weights and measures, similar to that of France, has been established for Holland, Brabant and Flanders, in which the Florin is made the monetary unit with decimal divisions.

1. What will 4853 kilo. of sugar come to, at 40½ florins per cent.?

4853
40½
194120
2426½
Ans. fl. 1965,46½ Centimes.
17

2. What will 4504 lbs. of sugar come to, at 14 grotes per lb. allowing 2 per cent. for draft, and 12 per cent. tare?

4504
draft 2 per cent. 90
4414
tare 12 per cent. 530
3884 Net
14
2)54376
2,0)2768,8
Ans. fl. 1384 8 stivers.

## *ANTWERP.*

Accounts are kept in Antwerp in gilders, shillings, and grotes, or in gilders and centimes.

12 grotes or pence, Fl.* make 1 shilling.
$3\frac{1}{3}$ shillings, or 40 grotes - - 1 gilder.

The Brabant or Antwerp grotes are of the value of the cents of the United States, a gilder being reckoned at 40 cts. In the current money of Antwerp they have stivers of the value of the stiver of Amsterdam, or 2 cts. U. States currency.

The Old conditions of sale, viz. stivers and grotes, are still quoted in Price Currents, but the accounts are stated in Florins and Centimes.

| | | |
|---|---|---|
| 100 pots Brabant | = | $36\frac{1}{2}$ gallons U. States. |
| 96 lb. Antwerp | = | 100 lb. do. |
| 100 Brabant ells, about | | 74 yds. American. |

### Example.

In Exchange with London *f.*11 19*st.* 6*d.* and 39*sh.* 11*d.* Flem. per £ are alike: thus,

| | | | |
|---|---|---|---|
| *f.*11 | 19 | 6 | *s.* *d.* |
| 20 | | | 39 11 |
| | | | 12 |
| $239\frac{1}{2}$ St. | | | |
| 2 | | | 479 pence = cents. |
| 479 grotes. | | | |

* Pence connected with shillings, Flem. are equal to cents, but connected with stivers are twelfths of a stiver, or $\frac{1}{6}$ of a cent.

The new quintal of Antwerp consists of 10 myriagrammes 204 lb. 14 oz. Avoirdupois weight.

$107\frac{1}{2}$ lbs. Antwerp - - - = 112 lbs. Eng.
$216\frac{11}{16}$ " - - - = 100 Kilograms.

In 5500 Kilos. of coffee, how many Antwerp lbs.?

100 : $212\frac{11}{16}$ : : 5500. Ans. 11698 lbs.

In 11698 Antwerp lbs. how many lbs. Eng.?

$107\frac{1}{2}$ : 112 : : 11698. Ans. 12188 lb. Eng.

Required the net sales of 1200 bags of coffee, weighing, viz.
kilo. 59466 = 126477 Antwerp pounds.

Off 2 per ct. for good weight 2530

123947

Tare 2 per ct. 2479

121468 Nt.

$6\frac{9}{16}$ stivers per lb.

At 6 728808

$\frac{9}{16}$ $683253\frac{3}{4}$

20)79713,$3\frac{3}{4}$

fl. 39856,69 centimes.

Discount 2 per ct. 797,13

Ans. fl. 39079,56

The amount of the gross sales of 800 bags of coffee in 1824 was fl. 26210,63.

On $\frac{3}{8}$ of which there was a discount of 2 per ct.

$\frac{3}{8}$ of it $1\frac{1}{2}$

Required the net sales. Ans. fl. 25768,33

An American merchant directs that fl. 26308,2 to his credit at Antwerp be remitted to London. Required the amount to his credit there, the remittance being effected at fl. 12,1 per £ ster..

12,1 26308 2

20 20

241 : 1 : : 526162 : Ans. £2183 4 11.

What is the interest of fl. 9161 for 43 days at 5 per cent?

9161
43

27483
36644

6,000)393,923

95,65 at 6 per cent.
Deduct $\frac{1}{9}$ 10,94

Ans. fl. 54,71

The several charges on sale of coffee in 1827, after deducting the discount, amounted to circa $7\frac{3}{4}$ per cent.

EXAMPLE.

| | |
|---|---|
| Gross sales—say - - - - | *f.*3773,00 |
| Discounting $1\frac{1}{2}$ per cent. - - - | 56,60 |
| | 3716,40 |
| Estimated charges on *f.*3716$\frac{40}{100}$ at $7\frac{3}{4}$ per cent. | 288,02 |
| *Actual* charges on the same in Oct. 1827, viz. | |
| Landing, &c. Duty, &c. - - - *f.*177,62 | |
| Com. and Guaranty - - - 111,49 | |
| | 289,11 |

In Oct. 1827, sugar, if sold at 18 florins per 50 kilos. would net $6,153 per 100 lb. Eng. exclusive of freight and commission. And to know how much it would net at any other price, multiply the quarter florins of difference from 18 florins, the assumed price, by ,088, and add or subtract as the case may be, for the answer.

EXAMPLE.

If Havana sugar be quoted and nets as before, how much would it net per 100 lb. Eng. exclusive of freight and insurance, if quoted at 24, $26\frac{1}{2}$, or 35 florins?

| | | | | | | |
|---|---|---|---|---|---|---|
| At 24 fl. or 24 qrs. diff. | × ,088 | = 2,112 | + 6,153 | = | $ 8,265 |
| $26\frac{1}{2}$ or 34 " " | × ,088 | = 2,992 | + 6,153 | = | 9,145 |
| 35 or 68 " " | × ,088 | = 5,984 | + 6,153 | = | 12,137 |

## *BREMEN.*

Accounts are kept in Rix Dollars and Grotes, reckoning 72 grotes to the rix dollar, which is equal to 2½ marks.

100 lb. Bremen Weight are equal to 110 lb. English.
102 lb. - - - - - 1 Cwt. = 112 lb.
30 Veltes Bremen Liquid Measure equal to - - - - } 60 Gallons
6 Stekans - - - - 31½ "
100 Ells (double) - - - 125 Yards.
105½ Feet - - - - - 100 Feet English.
1⅓ Bremen rix dollar or 96 grotes equal to - - - - } 1 Spanish dollar.

The Bremen Last is equal to 80 bushels in the U. States.

## *DENMARK.*

Accounts are kept in Danish dollars and Skillings, reckoning 96 skillings to the dollar.

"A new monetary system has been established in 1813, and by it the Rix-bank dollar is 27¼*d.* sterling."

2 Rix-bank dollars, or 192 skillings are equal to 3 marks, or 48 schillings, Hamburgh Banco.

Their weights are shippounds, lispounds and pounds—
16 pounds - make - 1 lispound.
20 lispounds, or 320 pounds - 1 shippound.
100 lbs. Danish are equal to 112 lbs. English.
320 " " make 1 shippound.
6¼ shippounds are equal to 1 ton English.
30 velts (viertiles) = circa 1 hhd. or 60 gallons.

In 1600 shippounds of iron, how many Danish and English lbs.?

1600×320=512000 Danish lbs.
At 12 per cent. adv. 61440

573440 English lbs.

How many tons English in 1600 shippounds?

| | |
|---|---|
| 6¼ | 1600 |
| 4 | 4 |
| 25 | 5)6400 |
| | 5)1280 |
| | Ans. 256 tons. |

| | | dls. sks. | | | dls. sks. |
|---|---|---|---|---|---|
| 4 pieces table cloth | - | 3 80 | - | - | 15 32 |
| 50 " | - | 9 56 | - | - | 479 16 |
| 100 coils cord, wt. 62*sh.* 16*l.* 2*lb.* 30 per shippound | | | | | 1884 18 |
| 1951 bars Rus. iron, 362 8 10 14 | - | - | - | | 5074 3 |

A bill is drawn in Copenhagen for 18574 marks, 7 stivers, Hamburgh money, when the exchange is 128 Danish dollars for 100 rix dollars in Hamburgh, how many Danish dollars does it amount to?

NOTE. Three marks are equal to 1 rix dollar.

| | *m.* | *r.d.* | | *m.* | *st.* | *r.d.* | *sk.* |
|---|---|---|---|---|---|---|---|
| If | 3 | : 1 | : : | 18574 | 7 : | 6191 | 46 |

| | *r.d.* | *D.d.* | | *r.d.* | *sk.* | |
|---|---|---|---|---|---|---|
| If | 100 | : 128 | : : | 6191 | 46 | Ans. 7925 Dan. dols. 6 sk. |

## *SWEDEN.*

In accounts, 12 Runstycks make 1 skilling, 48 skillings 1 Rix Dollar. The Banco dollar is 50 per cent. better than the current dollar.

A late price current gives the exchange with London at 12½ rix dollars for £1 sterling : with Hamburg at 129 skillings per rix dollar Ham. Banco.

Bills of Exchange are negotiated by sworn brokers, who are paid ¼ per cent. half by the drawer, and half by the purchaser, and no damage can be recovered on bills, returned protested, if not procured through *sworn* brokers.

All China goods sold here must be under the direction of the East India Company, but Bengal goods and spices may be sold as any other merchandize.

Weights—20 lbs. make 1 lispound, 20 lispounds = 1 shippound.

6 shippounds of 400 lb. each victual weight } =1 ton Eng.
7½ " 400 each of iron " }

By which it appears that 1 lb. or 1 shippound victual weight is one fourth heavier than that of iron.

The victual last is 12 ship. the iron last 15 shippounds.

The tub of steel of 150 lbs. = 112 lbs. English.

All metallic exports are sold per shippound of iron weight.

All imports per lb. victual weight.

In Liquids—2 Stoops make 1 Kan, 100 Kans=69 gallons.

The Ell is nearly 2 feet English.

In 1849 Sh. 19 Lis. 10 lbs. of iron, how many tons Eng. and what is the amount at £10 10s. per ton on board?

| | lbs. | £ | lbs. |
|---|---|---|---|
| | 300 : | 10½ : : | 73999* |
| 1849 19 10 | | | 10½ |
| 20 | | | 739990 |
| 36999 | | | 36999,5 |
| 20 | | | |
| lbs. | | | 3,00)7769,89,5 |
| 7½ lb. = 3000)739,990 | | | |
| | | | 2589,965 |
| Ans. 246,199 tons | | | 20 |
| | | | 19,300 |
| 300 | | | 12 |
| | | | 3,600 |
| | | | 4 |
| | | | 2,400 |

Ans. £2589 19 3½

*Omitting the ciphers.

## *STETTIN.*

Money. 1 Thaler (or thlr.) Prussian currency is reckoned for 24 Groschen, and 1 Groschen has 12 Pfennige.

Course of Exchange on London in March, 1825, was — — 6⅔ Thlr. for £1 ster.

On Hamburgh, was 150 Thlr for 300 Marks Banco.

| | | |
|---|---|---|
| 100 lbs. English give here | - - | 108 lbs. |
| 100 Denmark | - - - - | 106 |
| 100 Hamburgh | - - - - | 103 |
| 100 Riga | - - - - - | 89 |
| 100 kilograms | - - - - - | 213 |

58 gallons of rum are reckoned 1 hogshead.

100 yards English are 137 Ells of Stettin.

100 - - - - 158½ of Silesia.

1 Last of 72 Stettin scheffel, or bushels, gives about 14 English quarters.

110 lb. Stettin weight, is their Centner or hundred.

1. What will 10,000 gallons S. Sea oil come to, allowing 7⅛ lb. to a gallon, at 7½ thlr. per centner?

Ans. 4386 Th. 7 gr. 8 pf.

2. Sound Dues on 10,000 gallons of oil, at 1 thlr. 1 gr. per 480 gallons? Ans. 21 Th. 16 gr. 9 pf.

3. Reduce thlr. 4228 11 10 Prussian currency, to sterling, at 6⅔ th. per £. Ans. £618 16 1.

## *RUSSIA.*

Accounts are kept in Petersburgh, in Rubles and Copecs, reckoning 100 copecs to 1 ruble.

Their weights are Barquits, Poods, Pounds, and Zollotnicks—

| | | | |
|---|---|---|---|
| 96 zollotnicks | - | make | - 1 pound. |
| 40 pounds | - | - - - | - 1 pood. |
| 10 poods | - | - - - | - 1 barquit. |

100 lb. Petersburgh weight are equal to 88¾ lb. in the United States.

In weights—the ton of Exports is 63 poods, and the pood of Imports is 36 lbs. Avoir.

6 Barquits make a Last.

A Chetwert is 46 bushels.

Their long measure is the Arsheen, of 28 American inches: nine arsheens are equal to seven yards.

| | | |
|---|---|---|
| 3 versts | = | 2 Eng. miles. |
| The Russian league | | 4½ " |

All commercial business is transacted in the paper Ruble. The value of which, compared with the silver Ruble, is stated in the commercial regulations for the time by the Secretary of State. In July, 1827 it was valued at 10$\frac{5}{16}$ ster.

Great care is necessary in preparing a ship's papers for St. Petersburgh, if there is a cargo on board, "As nothing can be more rigid than the execution of the Impost laws."

| | | *rub. cop.* |
|---|---|---|
| 4997½ arsheens flems | 24 rubles per 50 arsheens | 2398 80 |
| 1700 do. drillings | 34 copecs per arsheen | 578 |
| 2101 poods 25 lb. hemp | 31 rubles per barquit | 6515 04 |

## *RIGA.*

In accounts—80 farthings, or ps. make 1 Albert Rix dollar. They have an imaginary money called Groschins, 90 of which make a dollar, and it is in this, that exchange is made.

In September, 1824, the rate on London was 292½ Groschins, equal to 3¼ Alberts, for £1 ster.

Weights—20 lbs. make 1 shippound, and 20 shippounds to 1 lispound, of 400 lbs. equal to 366½ lbs. Eng.

## *FRANCE.*

The money of account was formerly in Livres, Sous and Deniers.

Accounts are now kept in Francs, of 100 Centimes each, equal to 18¾ cents. 5⅓ Francs = 100 Cents.

The Franc is to the Livre, as - - 80 to 81
to the United States dollar - 16 to 3

Half of the sols or sous are pence sterling—20 sous =10*d.*
The Livres, less ¼, are shillings— - 24 Livres=20*s.*

*Rentes* in French funds are terms used for the dividends or interest paid on loans raised for the use of Government;—thus 1000 francs in the 5 per cents, are called 50 francs of Rente—which is a term generally synonymous with income or interest.

*To change Francs to Federal Money.*

RULE. From ¼ of the sum in francs, deduct ¼ of the same—the remainder is the answer.

EXAMPLE.

Change 894 francs 84 centimes to Federal money at par.

| | Proof. |
|---|---|
| ¼)894,48 | $167,71½ |
| | at 5⅓ francs each. |
| ¼)223,62 | |
| 55,90½ | 838,57½ |
| | 55,90½ |
| Ans. $167,71½ | fr. 894,48 |

*To reduce Livres, &c. to Federal Money at par.*

RULE. Multiply the sum by 5, and divide the product by 27.

EXAMPLE.

Reduce 6054 livres 15 sols to Federal money.

| | Proof. |
|---|---|
| 6054,75 | 9)6054,75 livres. |
| 5 | |
| 3)30273,75 | 3) 672,75 |
| 9)10091,25 | 74,75 |
| | 5980,00 francs. |
| Ans. 1121,25 | equal to $1121,25 |

An American merchant had to his credit in Paris 10609 frs. 66 centimes, which is remitted by his desire to London, when the exchange is 25 frs. 16 cts. per £ ster. Required the amount to his credit in London.

25,16 : 1 :: 10609,66

1

25,16)1060966(421

10064

5456

5032

4246

2516

1730

20

2516)34600(13

2516

9440

7548

1892

12

2516)22704(9

22644

Ans. £421 13 9.

*New Measures and Weights.*

| | | | |
|---|---|---|---|
| 1 | Tois for length | - - | 76,73 Eng. Inches. |
| 1 | Mètre | - - - | 39,37 " " |
| 1 | Are - superfices | - | 1077,12 Square Feet. |
| 1 | Stere - solidity | - - | 35,31 Solid Feet. |
| 1 | Litre - capacity | - - | 61,02 Cubic Inches. |
| 1 | Gramme weight | - - | 15,44 Grains Troy. |
| 1 | Kilograme | - - | 2,2 lbs. Avoirdupois. |
| 2½ | Hectolitres are equal to | | 8 Bushels. |

## *MARSEILLES.*

### *Notes of Weights, Monies, &c.*

Accounts are kept in Francs and Centimes, but prices are frequently quoted in Sous. 1 sous equals 5 centimes, 20 sous 1 franc.

The Marseilles lb. is 14 oz. 6 dr. Avoirdupois—the quintal or 100 lb. 89 lb. 14 oz. 3 dr. 100 lb. Avoirdupois equals 111¼ lbs. Marseilles weight.

The Kilograme legal French weight is 2 lb. 3 oz. 4 dr. ½ avoirdupois, or 15434 grains Troy weight. 100 lb. Avoir. equals ko. 45,434.

The Gold Coins of France, by act of Congress of 1816, are a legal tender at $17,45 per ounce standard; the standard weight of the 20 fr. piece being 4 dwt. 1 gr. 10 m.—the legal value of the franc is 17 cts. 72 m. which may be consideredas the par with France.

The price of Spanish Dollars varies in Marseilles, according to the demand, from 5f. 25c. to 5f. 40c.

The Par of Exchange on London when Gold is at 3*l*. 17*s*. 10½*d*. per oz. is 25f. 22c.

When Pepper is at 9 sous per lb. (45f. per ql.)—Exchange on London 25 30—Advance in U. States 10 per cent.—The Exchanges leave the net value of the franc 19c. 01m.—9 sous at this rate gives 9½ cts. per lb. Avoirdupois; if the proceeds are invested in Spanish Dollars at 5,30, which is about the common rate, the value of the franc being then but 18,56, would leave but little better than 9¼ cents. From these are to be deducted landing charges, commission, interest, guarantee, allowance for dust, and cost of bags, say together about 11 per cent. The ordinary charges on other goods may be calculated at from 7 to 8 per cent.

Cotton at 22¾ sous or 113,25 per 50 kilo.—the value of the franc 19 cents.

| | | | | |
|---|---|---|---|---|
| 20 sous | or 100,05 | francs | give cents | 17,30 m. |
| 2 " | or 10,00 | " | " " | 1,72 |
| ½ (of 1) | 2,50 | " | " " | ,43 |
| ¼ " | 1,25 | " | " " | ,21 |

22¾ so. or fr. 113,75c. equal to cts. 19,56 per lb. avoir.

207995 lbs. of sugar - - at fs. 45 pr. ct. } fs. 92661,73
——— discounting on the ½ 2 pr. ct. }

22702 lbs. of coffee, at - - - fs. 80 pr. ct. } fs. 18116,20
——— allowing for damp ¼ pr. ct. }
1778,9 kilos. indigo fs. 18, 12½ pr. ½ kilo. } 63195,42
——— discounting 2 pr. ct. }

There are two ways of purifying letters received in Marseilles from vessels in quarantine: one by immersion in vinegar, and the other by fumigation. Those who would prefer having their letters kept from the wet, are requested to write, "*A passer au parfum.*"

## *SPAIN.*

Spanish reckonings are of two sorts, viz.

Money of Plate, distinguished by effective*, or *hard* dollars, &c.

Money of Vellon, distinguished by *current* dollars.

The former is 88 4/17 per cent. above the latter.

100 reals plate being equal to 188 4/17 reals vellon

| | | | |
|---|---|---|---|
| 100 reals vellon | - - | 53⅛ do. | plate. |
| 17 reals plate | - - | 32 do. | vellon. |
| 17 piastres or current dollars | | 256 do. | do. |

4 maravadies make 1 quarto, 8½ quartos or 34 maravadies 1 real.

The peso. piastre, or current dollar of 8 reals plate, passes at 15 reals vellon in trade, but in exchange it is estimated at 15 reals vellon 2 maravadies.

The ducat of exchange is 375 maravadies.

The real plate is estimated at 10 cents, and the real vellon at 5 cents, in the United States.

The Spanish arobe, is 25 lbs.

100 lb. of Spain is 97 lb. English.

### *To change Reals Vellon to Reals Plate.*

Rule. Multiply the given sum by 17, and divide by 32 for reals plate.

### *To change Reals Plate to Reals Vellon.*

Rule. Multiply the given sum by 32, and divide by 17 for reals vellon.

## *CADIZ.*

Accounts are kept by some in hard or plate dollars, reals vellon, and quartos.

| | | |
|---|---|---|
| 8½ quartos make | - - | 1 real vellon. |
| 20 reals vellon | - - | 1 dollar of plate. |

* In drawing bills of exchange upon Spain this word is to be used, otherwise they may be paid in *current* dollars.

Others keep their accounts in reals plate and maravadies, reckoning 34 maravadies to 1 real plate.

A Last of salt is 77 bushels in Cadiz.

A Fanaga is equal to 1,56 bushel.

49⅔ Fanagas = 80 bushels, which would make it 1,6 bushel, or 1⅗ bushel.

30 Cantaros of wine are equal to 124 gallons.

*To bring Reals Plate into Dollars.*

RULE. Multiply the given sum by 32, and divide by 17 for reals vellon, and divide the reals vellon by 20 for dollars.

*To change Hard Dollars to Reals Plate.*

RULE. Multiply the dollars by 20 for reals vellon, and the reals vellon being multiplied by 17 and divided by 32, give the reals plate required:—Or, multiply the dollars by 10⅝ for reals plate.

*PRACTICAL QUESTIONS,*

*The answers to which are in dollars, reals vellon, and quartos.*

What will 45940 pipe staves come to, at 80 piastres or current dollars per M. or 1200?

Ans. 2306 h. dols. 0 r. 1 q.

| | | *Piast.* | *d.* | *r.* | *q.* |
|---|---|---|---|---|---|
| 21800 barrel staves, at 30½ per | 1200 | - - - | 417 | 3 | 7 |
| 1200 hhd. do. | 40 | do. - - - | 30 | 2 | 3 |
| 2 casks sherry wine | 30 | per cask - - - | 45 | 3 | 4 |

In St. Lucar, accounts are kept in reals plate and quartos, 16 quartos to 1 real plate.

*BILBOA.*

Accounts are in Reals Vellon and Maravadies.

20 reals make 1 hard dollar, and 15 1/17 reals, a current dollar.

Weights. The quintal is 100 lb. of 17 ounces.
do. of iron 155 - - 16 "

Measures. 32 velts - - - - - - 67 gallons.
100 fanegas of corn - 152 bushels.

Fish is sold per quintal of 107 lb. of 17 oz.

Merino wool at Bilboa should be bought by the pila or pile, which is an assortment of R, F, and T, or a proportion of them. The holders do not like to separate them, particularly the R, which is most valued in our manufactories. A pile of 100 bags, is 70 of R, 20 of F, and 10 of T. In the U. States, the proportion is ⅗ R, ⅕ F, and ⅕ T. The first sort is the fine Leonessa, the second, Segoviana, the third, Sexiana. The bags weigh 200 lb. Bilboa weight, which is

6¼ per cent. heavier than English. Orders should be there in May or June for purchasing.

### *ALICANT AND BARCELONA.*

90 reals vellon make 1 effective or hard dollar.
10$\frac{1}{7}$ " " 1 current dollar of exchange.

Merchants keep their accounts with Americans in dollars and cents.

The Spanish quintal is 96 lb. or 114 lb. English.

The arobe is 24 lbs. of Alicant.

A pound is 18 oz.; a modin 36 bushels, a cahiz of wheat is 7 bushels, and of soft almonds 1¾ cwt. English.

Wine is sold by the ½ pipe of 20 cantaros, of 3 gals. each.*
or per ¼ " 10 "
Brandy, - - " 40 "

Pipe staves are counted per M. of 1200, half-pipe staves 2 for 1, and barrel staves 4 for 1. Hoops per bundle of 80.

Salt is sold at La Matte per modin of 24 fanegas, equal to 28 English quintals, or 33 bushels, giving 95 lbs. to a bushel.

### *PORTUGAL.*

Accounts are kept in Millreas and Reas, reckoning 1000 reas to 1 millrea.

A vinten is 20 reas, and 5 vintens is a festoon of 100 reas.

The lawful money of Portugal is at a discount of 13½ per cent. in reference to coin—payments being made, one half in coin, and one half in paper; the latter estimated at 27 per cent. discount.

*Cloth Measure.* A vara is 43$\frac{1}{8}$ inches English.
A covedo 26$\frac{2}{8}$ " "

*Wine Measure.* 1 almude is 12 canados.
1 canado 4 quarteels.

An almude is 4½ gallons English wine measure.

A canado is 3 pints English.

*Corn Measure.* 1 moy is 15 fangas.
1 fanga 4 alquiers.

1 moy of 60 alquiers is 3 English quarters, or 24 bushels Winchester measure.

1 quarter is 20 alquiers

1 English bushel is 2½ alquiers in Lisbon, 2 alquiers in Oporto, and 2$\frac{3}{8}$ alquiers in Figuiras.

A moy of salt is the same measure as corn.

* 8 $\frac{1}{15}$ gallons.—Cambist.

A pipe of coals is 16 fangas.—1 fanga is 8 alquiers.
A pipe of coals is 128 alquiers, which at $2\frac{1}{2}$ alquiers per bushel, is $51\frac{1}{2}$ bushels English.
A moy is 23 bushel in Lisbon.
" $25\frac{1}{4}$ " " Figuiras.
" 30 " " Oporto.

*Weights.* 1 arobe is 32 pounds.
A quintal is 128 lbs. Portugal wt. which is equal to about 132 lbs. English avoirdupois weight.
A pound is about $16\frac{1}{2}$ ounces English.

Suppose a cargo is sold for 6245 millreas, at two months credit, for prompt payment of which $\frac{1}{2}$ per cent. per month is allowed; how much is the discount?

$\frac{1}{2}$)6245

31,225 for 1 month.
2

Ans. 62,450 for 2 months.

Or thus,

$\frac{1}{2}$ per cent. for 2 months=1 per cent.

6245
1

62,45

Suppose you import 5960 hhd. staves, and 5060 barrel staves, on which there is a duty of 23 per cent. which is taken in kind, how many of each remain for sale?

Ans. 4590 hhd. and 3897 bbl.

## *LEGHORN.*

Accounts are kept in Piastres, Soldi, and Denari, reckoning 12 deniers to 1 soldi, and 20 soldi to 1 piastre or dollar of 48*d.* sterling at par.

$1\frac{1}{2}$ paul, or 2 sols, are equal to 1 livre.
6 livres - - - 1 piastre or dollar.
$5\frac{3}{4}$ livres (effective money) 1 do.
1 ducat - - - $1\frac{1}{6}$ do.
1 paul is equal to $\frac{3}{4}$ of a livre.
In January, 1825, the Spanish dollar = $6\frac{1}{4}$ livres.
Exchange on London, $49\frac{1}{2}$*d.* per pezza.

*Weights.*—A pound is only 12 ounces in all commodities.
145 lb. is said to be equal to the English quintal of 112 lb. but fish generally renders about 136 to 138 lb. per quintal.
145 lb. in Leghorn make 112 in the United States.

*Measures.*—4 brasses - 1 cane.
100 " - 64 yards, United States.
1 palm - $9\frac{1}{2}$ inches, do.

4 sacks are 2 per cent. less than an English quarter of 8 bushels.

| | | piast. | s. | d. |
|---|---|---|---|---|
| 9370 lb. rice | 24 liv. cur. mon. per 100 | 374 | 16 | 0 |
| 97270 lb. logwood | 16 piastres per 1000 | 1556 | 6 | 4 |
| 4170 lb. Russia wax | 33½ ducats per 100 | 1629 | 15 | 6 |
| 104060 lb. sugar | 30 piastres per 151 lb. | 20674 | 3 | 5 |
| 3350 lb. loaf sugar | 30 do. per 100 | 1005 | 0 | 0 |

## *NAPLES.*

Accounts are kept in Ducats and Grains, reckoning 100 grains to the ducat.

The current coins are grains, carlins, ducats, dollars, and ounces.

10 grains make - - 1 carlin.
10 carlins " - - 1 ducat.
3 ducats " - - 1 ounce.

The Naples dollar passes for 120 grains, and the Spanish dollar for 126 grains.

100 lb. Naples weight are equal to 64⅝ lb. English.

Brandy is sold per cask of 12 barrels, or 132 gallons; 60 karafts make a barrel.

Sewing silks are sold per lb. of 12 ounces.

Lustrings are sold per cane of 84 inches.

Sugar, coffee, fish, and tobacco, are sold per cantar, of 196 lbs. in the United States.

The cantar is subdivided into 100 rotolas of 33 ounces each.

| *can.* | *rot.* | | *ducats.* | | *duc.* | *gr.* |
|---|---|---|---|---|---|---|
| 3 | 73 | of coffee - - | 73 | per cantar | 272 | 29 |
| 16 | 19¾ | soap - - | 21 | - - | 340 | 14 |
| 7 | 64 | raisins - - | 12 | - - | 91 | 68 |
| 2 casks 11 bbls. 4 kar. | | | brandy 102 | per cask | 298 | 06 |

## *TRIESTE.*

Accounts are kept in Florins and Kreutzers—60 kreutzers make 1 florin.

The other kinds of money are Soldi and Livres.

20 soldi - make - 1 livre.
5¼ livres - - - - 1 florin.

100 lb. Vienna weight = 123 lb. Avoirdupois.

A brace is 27 inches, or ¾ of a yard English.

An orna of oil is 17 gallons.

A staro of wheat is $2\frac{3}{8}$ bushels nearly—$3\frac{1}{3}$ staros are equal to an English quarter of 8 bushels.

Sales and purchases are usually made in bills on Vienna, at 3 months date.

## *GENOA.*

Accounts are kept in Denarii, Soldi, and Pezzos or Lires.

12 denarii - - make - 1 soldi.
20 soldi - - - - - - 1 pezzo or lire.
1 pezzo of exchange - - - $5\frac{3}{4}$ lires.

The course of exchange is various—from 47*d.* to 58*d.* sterling per pezzo or lire.

In Milan, 1 crown = 80 soldi of Genoa.
In Naples, 1 ducat = 86 do.
In Leghorn, 1 piastre = 20 do.
In Sicily, 1 crown = $127\frac{7}{9}$ do.

The Spanish dollar was valued at 129*s.* 6*d.* in 1821.

A Cantar is 100 rotola = 150 lb. of Genoa.
112 lb. Eng. - - - = 156 " "

A barrel of Oil is $187\frac{1}{2}$ lbs. and contains 17 gallons Eng.
$13\frac{7}{8}$ barrels are a tun of - - 236 " "
A Mina is $3\frac{1}{3}$ bushels, $2\frac{2}{5}$ Minas = 8 bushels - "

## *PALERMO AND SICILY.*

Accounts are kept in Onges, Tarins and Grains.

20 grains - make - 1 tarin.
30 tarins - - - - 1 onge or ounce.

Feb. 3, 1803, the value of the money of Palermo in U. S. currency was as follows:

1 grain - equal to - - - 4 mills.
20 do. = 1 tarin - = - - 8 cents.
240 do. = 12 do. = 1 Sc. dollar = 96 do.
600 do. = 30 do. = $2\frac{1}{2}$ do. = 1 onge = 240 do.

The Spanish dollar is current at 252 grains. The value of the onge at par is 11*s.* 3*d.* sterling. The exchange on London, Feb. 3, 1803, was 56 tarins for the £ sterling, or 10*s.* $8\frac{1}{2}$*d.* sterling per onge.

The cantar of Sicily - = - 176 lb. Avoirdupois.
The rotola - - - - = - $1\frac{3}{4}$ lb. do.
100 rotola make a cantar.

A cantar of oil is 25 gallons English measure. The Sicilian barrel contains 9 gallons.

Mahogany is sold by weight; one foot, board measure, will weigh about 2 rotola.

The measure called Caffis is $3\frac{1}{4}$ gallons.

The lb. in Sicily is 12 oz. Avoirdupois.

The Salm is 485 lb. Avoirdupois.

## *VENICE.*

Venice has three kinds of money, viz. Banco money, Banco current money, and Picoli money. Banco money is 20 per cent. better than banco current, and banco current 20 per cent. better than picoli.

The different denominations of money are Denari, Soldi, Grosi, and Ducats.

12 denari, or deniers d'or, make 1 soldi, or sol d'or.
$5\frac{1}{6}$ soldi - - - - 1 gros, or grosi.
24 gros, or grosi - - 1 ducat.

100 ducats banco of Venice in Leghorn = 93 pezzos.
100 " " of " in Rome = $68\frac{1}{2}$ crowns.
100 " " of " in Lucca = 77 do.
100 " " of " in Frankfort = 139 florins.

The par of exchange in 1798 was $50\frac{1}{4}d.$ sterling per ducat banco.

## *MALTA.*

In accounts, 20 grains make 1 Tari, 12 Taris 1 Scudo. The Spanish dollar passes in the Government Offices for 30 taris. In trade generally at 31 taris.

Doubloons for $38\frac{3}{4}$ scudos.

| | | |
|---|---|---|
| A salm of 16 tomoli is - - - | 8 | bushels Eng. |
| The barrel of wine or brandy - | 11 | gallons " |
| A caliso - - - - - | $5\frac{1}{3}$ | " " |
| The cane - - - - - | 83 | inches. |

## *SMYRNA.*

Accounts are kept in piastres and hundredths, except the English accounts, which from ancient custom are kept in piastres and eightieths or half paras.

The fractional parts are sometimes called aspers, 100 aspers to 1 piastre.

The following calculations are made in piastres and hundredths.

A piastre is equal to 40 paras.

The exchange on London was 13 piastres for £1 sterling in 1800, and in 1825 it was 47 piastres. The value of the *piastre* varying in that time from 34 to $9\frac{1}{2}$ cents.

Their weights are the Rotola, Oke, Checque, and Tiffee.

| | | |
|---|---|---|
| A rotola - - | marked *Ro.* | is 180 drams. |
| An oke - - - - - | | is 400 do. |
| A checque of opium - - - | | is 250 do. |
| A checque of goat's wool - | | is 800 do. or 2 okes. |
| A tiffee of silk - - - | | is 610 do. |

100 rotolas, 1800 drams, or 45 okes are a quintal of this country.

112 lb. English should render here $40\frac{3}{4}$ okes, or $90\frac{5}{8}$ rotolas.

45 okes of this country render $123\frac{3}{4}$ lb. English.

A pike is 27 inches nearly.

*PRACTICAL QUESTIONS.*

1. How much will 10 serons of cochineal come to, weighing net 724 okes 73 rotolas, at 80 piastres per oke?

724,73
80

Ans. 57978,40 piastres.

2. 229 bags of sugar, weighing 506 quintals 96 rotolas, tare 14 rotolas per bag, at 110 piastres per quintal?

| | | |
|---|---|---|
| gross | 506 96 | 299 |
| tare | 41 86 | 14 |
| neat | 465 10 | 1196 |
| | 110 | 299 |
| Ans. | 51161 00 piast. | 100)4186 |
| | | 41 86 |

3. 4 cases of opium, weighing gross 1026 rotolas, tare 84 okes 75 rotolas, at $10\frac{3}{4}$ piastres per checque?

NOTE. 1 rotola is equal to $\frac{9}{20}$ of an oke, and 1 oke to $1\frac{1}{2}$ checque.

$\frac{9}{20}$)1026 rot.

| | | |
|---|---|---|
| gross okes | 461 70 | |
| tare | 84 75 | |
| net okes | 376 95 | 376 95 |
| | $1\frac{1}{2}$ | 3 |
| | 376 95 | 5)1130 85 |
| | 226 17 | 226 17 |
| cheques | 603 12 | |
| | $10\frac{3}{4}$ | |
| | 6031 20 | |
| | 301 56 | |
| | 150 78 | |
| Ans. piast. | 6483 54 | |

4. 698 pieces of copper, net okes 19743,85, at $\frac{7}{10}$ or 70 paras per oke?

19743,85
70

4|0)13820695|0

Ans. piast. 34551,73

5. What is the custom-house duty on 19740 okes of copper at $2\frac{1}{2}$ agio $2\frac{1}{2}$ per cent.?

NOTE. The charges are all established by a tariff of the Levant Company.

19740
$2\frac{1}{2}$

39480
9870

4|0)4935|0

agio $2\frac{1}{2} = \frac{1}{40}$)1233,75 amount of duty at $2\frac{1}{2}$ paras.
30,84 agio at $2\frac{1}{2}$ per cent.

Ans. piast. 1264,59

6. English consulage on 430 quintals, at $5\frac{1}{2}$ piast. agio 7 per cent.?

430
$5\frac{1}{2}$

2150
215

2365
7

Ans. piast. 165,55

7. Custom-house duties on 88 quintals 90 rotolas, at $\frac{3}{110}$, agio $2\frac{1}{2}$ per cent.?

88,90
20

11|0)17780|0

$2\frac{1}{2} = \frac{1}{40}$)16,16
,40

Ans. piast. 16,56

8. What will the following charges amount to, viz. porterage $\frac{8}{410}$, house porters $\frac{4}{410}$, weighing $\frac{2}{410}$, chan duty $\frac{2}{410}$, visiting and marketing $\frac{1}{410}$ per quintal on 438 quintals?

| | | | |
|---|---|---|---|
| porterage - - - | 8 | | 438 |
| house porters - | 4 | | 17 |
| weighing - - - | 2 | | |
| chan duty - - - | 2 | 4\|0)744\|6 | |
| visiting - - - - | 1 | | |
| | 17 | Ans. piast. 186,15 | |

*The following is part of a very interesting article relative to the commerce of Smyrna, from the Oriental Herald.*

The merchants of the different nations in Europe, resident at Smyrna, keep their books in piastres, and minor subdivisions of the same coin. The English subdivide them into 80; the French into 100; and the people of the country, that is, the Turks, Jews, Greeks, and Armenians into 120 parts. Bills of exchange are often drawn on Smyrna in foreign coin, particularly in Spanish dollars, which are always to be had there; but if drawn in a coin not in current use, the exchange of the day is established to make the payment. From Egypt they almost invariably draw in Spanish dollars, or Venetian sequins.

*Current Coins.*

The current Coins of Smyrna are as follows:

Silver—Piastres of 40 paras, which are the piastres of the Grand Seignior.

Piastres of 100 paras, worth 10 per cent. more than at Constantinople.

Piastres of 200 paros, very commonly called also Turkish dollars.

Gold—Stamboul of 290 paras, } with ½ and ¼ of each; and, like
Funduc of 400 paras, } the former, worth more than
at Constantinople.

The foreign Coins in general use at Smyrna are,

Silver—Imperial dollars worth 6½ piastres, issued from Austria.

Spanish dollars, the same nominal value, but preferred in large payments, as being of a little more value in Europe.

Gold—Ducats of Holland worth 13¼ piastres.

Ducats of Austria and Hungary, 13 piastres.

Venetian sequins, 13¾ piastres.

Spanish doubloons, 15 to 16 Spanish dollars.

Payments for goods sold, are generally made in light monies, which cannot be refused without protracting the payment for a long period. The merchants here assume the privilege of charging ½ per cent.; and some Europeans charge even 1 per cent. for that loss, under the name of shroffage; but if sales are often made for cash, it will sometimes amount to 2 per cent.

The nominal values of coins in Turkey have augmented in a very rapid degree, while those coins have been as rapidly diminishing in their intrinsic worth; an effect which is produced by the frequent calling in of the current money by the Porte, in moments of demand, and issuing it again at a more advanced rate and debased quality. The result of this impolitic measure is the real depression of their coin, and an augmentation of the price of goods, as well as of the rate of exchange on foreign parts.

In the year 1803 the Spanish dollar was worth 3¼ piastres; in 1807, it had risen to 4½; and in 1812, it passed at 6½, though its true value remains nearly stationary. The Turkish dollar of 5 piastres is equal in weight with the Spanish dollar, and is intended by the sagacious Turks to represent the same kind of money; but its intrinsic value does not certainly exceed one-fourth of that coin. The Porte, having no silver mines, buys up the Spanish dollars for the supply of the mint, in which tin and zinc are the prevailing metals used. It is owing to these successive degradations of their piastres that, in lending money on interest, the sum borrowed is advanced in foreign coin, and the obligation is invariably to return the same kind of money, both in principal and interest. It has often happened, indeed,

hat between the period of a mortgage being made and released, the increase of nominal value in current money has amounted to 50 per cent. which would thus have ruined the lender.

The interest on money lent is as under:

| | | |
|---|---|---|
| To Franks or Europeans | | 10 per cent. per annum. |
| Levantines | of first credit, | 12 per cent. per annum. |
| " | of second credit, | 15 per cent. per annum. |
| Turks | of first credit, | 15 per cent. per annum. |
| " | of second credit, | 20 per cent. per annum. |

Bills of exchange from any one part of Turkey on another, are drawn at eleven days; those from Turkey on Continental Christendom, at thirty-one days; and on London generally, at forty-five and sixty days.

### *Weights and Measures.*

The various denominations of weights which exist in Turkey, generally bear a reference to a certain number of drachms; but properly speaking, all goods are weighed by the rotola, which is afterwards reduced into the other smaller weights in use for circulation. There is also a difference in the weight by a steelyard and by scales at a beam, the latter bearing a disadvantage to the scale of about three per cent.; but there are certain goods only sold by the balance, such as cochineal, cloves, nutmegs, &c.

| | | | |
|---|---|---|---|
| 1 Rotola has | 180 drachms, | and equals | 1½ lbs. Eng. |
| 1 Oke | 400 " | | 2 4-5ths. " |
| 1 Quintal 45 okes | 1800 " | | 155 " " |
| 1 Taffee of Brusa silk | 610 " | | 4¼ " " |
| 1 Checque of opium | 250 " | | 1¾ " " |
| 1 Checque of goat's wool | 800 " | | 5 3-5ths " |
| 1 Metical of gold, pearls, &c. | 1½ " | | |

1 Kilo of corn, Constantinople standard, weighs about 23 okes.
1 " " Smyrna standard, 33 okes.
1 " of rice, in all Turkey, weighs 10 okes.

8½ Smyrna kilos of corn are equal to a salm, or an English quarter.

1 Pike, a cloth measure, is 27 inches, or three-fourths of an English yard.

106¼ Endezia, a measure of the shop-keepers, equal 100 pikes.

*Conditions of Sale, Credit, &c.*

The only articles which are always sold for cash, are cochineal, tin, Mocha coffee, and pepper. Other colonial produce sells at one or two months credit; but when articles are scarce, by sacrificing one or two per cent. on the price, cash may be readily obtained. All manufactured goods, excepting cloths, may be sold in small parcels, partly for cash and partly on short credit, when the articles are in demand and scarce; if, however, there is a plentiful supply to answer the demand, the credit is then extended to four and six months, and when the market is full, without demand, sales cannot be effected at less than eight or twelve months credit. In general, payments are made in three instalments, and in what has been already said, it must be understood as fixing the period for the final settlement of the account. When sales are forced in order to obtain cash, it is necessary to make a sacrifice of twenty or twenty-five per cent. and even then they cannot be effected to any great amount. The buyers of cotton manufactures are not considered so solid in their responsibility as the cloth dealers, yet there is not much risk with them, if sales are made with judgment. It may be observed that the trading capital of Turkey is very small, which forces the shop-keepers to buy on credit, and carry on their trade with the capital of the Europeans; and, as their payments cannot be made until the goods themselves are sold, there is an extreme degree of uncertainty in the most fixed periods. Colonial produce may be easily bartered for the produce of the country, excepting fruits, opium, silk, and copper, which are always bought with cash in hand. Manufactured goods are more difficult to be bartered for in this way, and never can be exchanged for the whole amount of their value only; as if 1000 piastres of goods are to be disposed of, 2000 piastres of produce must be taken, and the balance paid in cash. The buyers of cloth, though solid in the result, are long paymasters, extending the nominal credit of two or four months to one or two years; and though the Turks buy from the Europeans every thing on credit, yet, in the sale of their own productions, they almost invariably insist upon cash in hand.

The charge of warehouse rent is fixed at one-half per cent.; the house and street brokerage on importations at 2 per cent., and the same on exportations at 1½ per cent. All other charges are real, and must be specified. In the

aggregate, therefore, the whole expenses on a parcel of goods sold may be calculated to amount to 10 or 15 per cent. ad valorem, and on those bought it will be more uncertain.

Opium is one of the most important articles of Turkey. It is the juice of the black poppy, a plant grown in Carissa, Ujack, and Jullah, a distance of about ten days journey from Smyrna. It is sown in November and December, and in June the plant forms a ball, which contains the seed. In these balls incisions are made, from which oozes out a milky substance, which is collected gradually, and formed either into cakes about the size of a biscuit, or balls as large as a four-pound shot, when it is sent to Smyrna in baskets of from 85 to 90 checques each, about the end of July. This is also often adulterated, by being mixed with the juice of other fruits. For this reason, it is usual to have it examined by connoisseurs of the article, who receive one-half per cent. for their inspection, and if found thus mixed, it is returned to the seller. This article, if bought from the end of July until November, will lose 6 or 8 per cent. in weight. After December, it will scarcely lose any thing; and neither the quality or strength are deteriorated by being kept five or six years, though it hardens. A good crop will yield 1500 baskets, and an ordinary one from 1000 to 1200; of which quantity it is known, with certainty, that not more than 200 are used in the Turkish empire, so that the practice of chewing opium, though still considered general here, is less universal among the people than would be imagined. It is even calculated, by long residents among them, that throughout the Turks of all classes, there are not more than two in a hundred who use this pernicious drug. The best qualities are exported by the English and Americans for their separate speculations to China, and various parts of the East Indies.

Grain cannot be exported from Smyrna without a firman, or express permission from the Grand Seignior; but though this prohibition extends over all parts of Turkey, yet it may always be loaded from the smaller ports by bribing the custom-house officers, who, in the farming of their situations from the Porte, calculate such gains as necessary and honourable profits, and regulate their purchase money according to the greater or less facility of reimbursing themselves by such means. The principal places of export for grain from Anatolia, are Scalanuova and Sanderlee; but all the

business at those places is done through the merchants of Smyrna. The Gulf of Salonica, the coast of Caramania, Satalia, and Syria, also export large quantities of grain; but Egypt is the chief granary of the East, whose harvests are scattered over all the Meditterranean. At all those places grain must invariably be purchased with cash, and for that purpose Spanish dollars are found to be most generally acceptable. In time of peace between Russia and Turkey, the Black Sea furnishes also immense supplies of grain; but if a vessel from that sea should be driven, either by stress of weather, necessity, or convenience, into a Turkish port, the bakers of the country may stop the cargo, by paying for it a price arbitrarily fixed by their own government; which is the case with hemp, and other articles from the Black Sea, which the Turks may, at any time, be likely to want. To obviate this evil, vessels touching at ports often anchor without the castles which guard their entrance; while in town, the goods are easily sold, and transferred to European vessels.

Rice, which is an article of food in universal consumption throughout Turkey, arrives here chiefly from Egypt, and is sold for cash, by the kilo of ten okes, which is worth at present 6½ piastres. Scarcely a meal is made, either by the Turks or Christian natives of Turkey, without a pilau or dish of boiled rice, which makes its consumption immense, and there is never a scarcity in the markets. Carolina and India rice are well known, but as they are not so much esteemed, they sell in general, about 10 per cent. less than the rice of Egypt.

## *ODESSA.*

The commerce of Odessa employs many kinds of money, but all contracts and payments are made in Russian bank notes. The silver rouble has a value, varying according to the rate of paper money, if it may be thus expressed. In 1817, the silver rouble was fixed at four roubles in bank notes. The Dutch ducat, the Spanish and Imperial dollar, and Turkish piastre, all experience variations in comparison with the paper rouble. This difference gives rise to an agio; and the foreign coins just mentioned, and silver roubles are sent to Petersburg, Moscow, Astracan, and invested in bank notes, which generally yield a profit.

Accounts are kept in roubles and copecs.

The Russian *gold coins* are Imperials of 10 roubles, and half Imperials of 5 roubles, which are seldom seen at Odessa.

The *silver coins* are roubles of 100 copecs, half and quarter roubles, 15-copec pieces, 10 and 5-copec pieces.

In *copper* are 5, 2, and 1-copec pieces; denuschka or half copec pieces; polushka or quarter copec pieces. The copper copecs are used in retail, and are not a subject of speculation as silver roubles are.

The weights and measures of Odessa are like those of St. Petersburg.

3 Solotniks—1 Loth.
32 Loths or 96 Solotniks—1 pound Russia.
40 Pounds Russian—1 poud or 36 lbs English.
63 Pouds—1 Ton English.
10 Pouds—1 Berquet.
6 Berquets—1 Last.

1 Berquet is equal to $350\frac{1}{2}$ lbs. at Leipsic.
$331\frac{1}{3}$ " Amsterdam.
$356\frac{1}{2}$ " London.
$334\frac{1}{5}$ " France.
$337\frac{3}{4}$ " Hamburg.

1 Quintal of Vienna and Constantinople = 3 pouds 17 lbs.

For the measure of wheat the Chetvert is used, which is = $5\frac{3}{10}$ Winchester bushels, and $5\frac{3}{4}$ kilos of Constantinople.

For liquids the Vedro is made use of, which contains $3\frac{3}{5}$ gallons English.

The measure for cloths, distances, &c. are the following:

16 Vershoks 1 Russian ell or arsheen, equal to 28 inches.
9 Arsheens are 7 yards English.
1 Sashen is 3 arsheens, or 48 vershoks, = 7 English feet.
1 Verst is 500 sashens, or 1500 arsheens, or 24000 vershoks, or 3500 feet.

Odessa enjoys equal advantages with other cities for the negotiation of bills of exchange, and from its situation the merchants will probably become bankers for St. Petersburg, Hamburg, and other places, for their operation with Turkey. There is an exchange between Odessa and Constantinople, Paris, Vienna, Breda, Amsterdam, Hamburg, and London. The exchange with the interior is generally made at par, but bank notes are usually sent by the post, and the government insure them for $\frac{1}{2}$ per cent. for 500 verstes, and 1 per cent. for any greater distance; a copec per solotnik, or $\frac{1}{96}$ of a hundred weight is also paid upon these notes for the use of Odessa.

## CALCUTTA.

Accounts are kept in Rupees, Annas, and Pice.

*Coins.*—12 Pice make - - 1 Anna.
16 Annas - - - 1 Rupee.
16 Rupees - - - 1 Gold Mohur.

*Currency.*—12 Current Pice make 1 Current Anna.
16 Current Annas - 1 Current Rupee.

The East India Company's accounts were formerly kept in currency, but are now kept in siccas.

| | | | |
|---|---|---|---|
| 100 Sicca Rupees, | equal to | 116 | Current Rupees. |
| 100 Sonaut | " | 111 | " " |
| 100 Bombay | " | 110 | " " |
| 100 Arcot | " | 108 | " " |

A Lac of Rupees is 1,00,000 ; and a Crore, 100 Lacs, or 1,00,00,000 Rupees ; and in accounts, sums are distinguished into Crores, Lacs, and single Rupees, by marks or divisions, as in the preceding examples.

A current rupee is reckoned at 2*s.* and a sicca rupee at 2*s.* 6*d.*

Small shells, called Cowries, used in paying coolies, &c. are reckoned as follows, viz.

4 Cowries make - - - 1 Gunda.
20 Gundas - - - - 1 Pun.
16 Puns - - - - - 1 Cahun.
4 Cahuns - - - - 1 Rupee.

This is the table in reckoning, but the price is generally from 4 to 6 cahuns and odd pice in the Bazar.

### *Reckoning by the Tale.*

4 Particulars make - 1 Gunda.
5 Gundas, or 20 Particulars - - - 1 Corge

The Cubit is 18 inches.

### *Bazar or Great Weights.*

5 Sicca weight make - - 1 Chittack.
16 Chittacks - - - 1 Seer.
40 Seers - - - - - 1 Maund.
The Factory Maund is - - $74\frac{2}{3}$ lbs. Avoir.
The Bazar Maund is - - - $82\frac{2}{15}$ " "
10 Bazar, or 11 Factory Maunds = $82\frac{1}{2}$ " "

How many Bazar Maunds in 676 M. 17 S. 9⅞ Cks. F. weight.

| | *M.* | *S.* | *C.* | | | | | |
|---|---|---|---|---|---|---|---|---|
| Deduct $\frac{1}{11}$) | 676 | 17 | 9⅞ | Add $\frac{1}{10}$) | 614 | 37 | 12⅞ | B. wt. |
| | 61 | 19 | 12⅜ | | 61 | 19 | 12⅜ | |
| Ans. | 614 | 37 | 12⅞ Baz. wt. | | 676 | 17 | 9⅞ | Fac. wt. |

NOTE. 1½ Factory Maund is equal to 1 cwt. Eng.
Or 74⅔+37⅓ lb. =112 lb.

*To reduce English weight to Factory Maunds.*

RULE. For cwts. and quarters—Multiply the cwts. by 1½ for Maunds, and take parts for the quarters, at 60 Seers per cwt. If the quantity be in pounds—Take half of the pounds for Seers, and add to it $\frac{1}{14}$ of the same half, and divide the sum of both by 40 for Maunds

EXAMPLE.

In 485 cwt. 3 qrs. how many Factory Maunds?

| | | *M.* | *S.* | *Cks.* |
|---|---|---|---|---|
| At 1 | M. | 485 | 0 | 0 |
| " | ½ | 242 | 20 | 0 |
| " 2 | qrs. | | 30 | 0 |
| " | | | 15 | 0 |
| Ans. F. Maunds | | 728 | 25 | 0 |

Reduce 6789½ lbs. Av. to Factory Maunds.

6789½ lbs.

| | | | | Or thus, for $\frac{1}{14}$ | | | |
|---|---|---|---|---|---|---|---|
| ½ = | 3394 | 12 | | 2)3394 | 12 | | |
| $\frac{1}{14}$ = | 242 | 7⅝ | | 7)1697 | 6 | | |
| 4,0)363,7 | 3⅝ | | | 242 | 7⅝ | | |
| Ans. F. M. | 90 | 37 | 3⅝ | | | | |

Deducting $\frac{1}{11}$ gives the Bazar weight as before.

| *Cwt. qr. lb.* | | | | *M.* | *S.* | *Cks.* | |
|---|---|---|---|---|---|---|---|
| 126 | 0 | 20½ | are equal to | 189 | 10 | 13 | Factory wt. |
| 132 | 1 | 19 | | 198 | 25 | 2⅝ | " " |
| 94 | 2 | 23 | | 129 | 5 | 8 | Bazar " |
| 411 | 1 | 6 | | 560 | 34 | 12 | " " |

*A TABLE for reducing English weight to Factory Maunds, by inspection.*

| Eng. Weight. | F. M. | Srs. | Ctks. | 7ths. | lbs. | Srs. | Ctks. | 7ths. |
|---|---|---|---|---|---|---|---|---|
| Cwt. 100 | 150 | — | — | — | 14 | 7 | 8 | — |
| 40 | 60 | — | — | — | 12 | 6 | 6 | 6 |
| 30 | 45 | — | — | — | 11 | 5 | 14 | 2 |
| 15 | 22 | 20 | — | — | 10 | 5 | 5 | 5 |
| 5 | 7 | 20 | — | — | 9 | 4 | 13 | 1 |
| 4 | 6 | — | — | — | 8 | 4 | 4 | 4 |
| 3 | 4 | 20 | — | — | 7 | 3 | 12 | — |
| 2 | 3 | — | — | — | 6 | 3 | 3 | 3 |
| 1 | 1 | 20 | — | — | 5 | 2 | 10 | 6 |
| qrs. 3 | 1 | 5 | — | — | 4 | 2 | 2 | 2 |
| 2 | 0 | 30 | — | — | 3 | 1 | 9 | 5 |
| 1 | 0 | 15 | — | — | 2 | 1 | 1 | 1 |
| lbs. 24 | — | 12 | 13 | 5 | 1 | — | 8 | 4 |
| 20 | — | 10 | 11 | 3 | oz. | | | |
| 19 | — | 10 | 2 | 6 | 8 | — | 4 | 2 |
| 18 | — | 9 | 10 | 2 | 4 | — | 2 | 1 |
| 16 | — | 8 | 9 | 1 | 2 | — | 1 | — |

*Use of the Table.*

Reduce 415 cwt. 3 qrs. 24½ lbs. to Factory Maunds.

| | | | | |
|---|---|---|---|---|
| Cwt. 400 | = | 600 | 0 | 0 |
| 15 | = | 22 | 20 | 0 |
| 3 qrs. | = | 1 | 5 | 0 |
| 24 lbs. | = | 0 | 12 | 13½ |
| 8 oz. | = | 0 | 0 | 4½ |
| | Ans. | 623 | 38 | 2 Factory Weight. |

What will 522m. 31s. 6 cks. of sugar come to at 5 rupees per Maund? Ans. rs. 2613 14 9.

How much will 465 pieces of cloth come to at 23 rupees per corge? Ans. rs. 534 15 0.

A. shipped $6000 in the Washington, for Calcutta, at 8¼ per cent. for frieght, and 2½ per cent. for commission. On sales of the dollars there, at 207 sa. rupees per 100, required the net proceeds remaining for investment?

| | *Sa.Rs.* | *A.* | *P.* |
|---|---|---|---|
| 6000 dollars at 207 sa. rs. per 100 - | 12420 | 0 | 0 |
| Freight at 8½ per cent. - - - | 1055 | 11 | 2 |
| Commission at 2½ - - - - | 310 | 8 | 0 |
| Net proceeds remaining for investment | 11053 | 12 | 10 |
| Proof, sa. rupees | 12420 | 0 | 0 |

A Captain bound to Calcutta received of A. D. & Co. $2500 at 8½ and 2½ per cent. for freight and commission. On his arrival there, he sells the dollars at 207 sa. rupees per 100. The amount of his investment for them was Sa. Rs. 4509, on which he received a drawback of Rs. 84 14 0. Supposing A. D.'s part of expenses of package, screwing, cooley-hire, &c. to be Rs. 176 10 6, what was the balance on stating the account in Calcutta, and in whose favour?

Ans. Sa. Rs. 4 15 7 in favour of A. D. & Co.

A.'s dollars in the Washington, Capt. M. for Calcutta, amounted to 5999.* On deducting $6,44 for short weight, they were sold there at Sa. Rs. 210 $\frac{1}{32}$ per 100—and A.'s credit of interest was Sa. Rs. 55 15 6. Capt. M.'s commission was at 2½ per cent. on the specie. The cost, &c. of the return cargo, which was on freight, amounted to Sa. Rs. 12289 10 7, and A.'s part of the expense of house rent was Sa. Rs. 37 6 4. Required the balance on stating the account in Calcutta?

Ans. Sa. Rs. 0 8 2 in favour of A.

* $6000 less 1, bad.

The following method of arranging the sales, freight and commission, in any port, (if there be different shippers) will aid a Captain or Supercargo in seasonably detecting errors in his calculations. And a similar statement for the return cargo, will be serviceable to those who do not state their accounts in the Italian manner, or double entry The terms of shipments being at 8½ per cent. for freight, and 2½ per cent. for the Captain's commission, and the price 207 sicca rupees per $100 in Calcutta.

| *Shippers.* | *Dollars* | *Sa. Rs. A. P.* | *Freight.* | *Commission.* | *Net Sales.* |
|---|---|---|---|---|---|
| A. | 1000 | 2070 0 0 | 175 15 2 | 51 12 0 | 1842 4 10 |
| B. | 6000 | 12420 0 0 | 1055 11 2 | 310 8 0 | 11053 12 10 |
| C. | 5000 | 10350 0 0 | 879 12 0 | 258 12 0 | 9211 8 0 |
| D. | 4000 | 8280 0 0 | 703 12 10 | 207 0 0 | 7369 3 2 |
| E. | 2000 | 4140 0 0 | 351 14 6 | 103 8 0 | 3684 9 6 |
| F. | 500 | 1035 0 0 | 87 15 7 | 25 14 0 | 921 2 5 |
| G. | 3000 | 6210 0 0 | 527 13 7 | 155 4 0 | 5526 14 5 |
| H. | 3800 | 7866 0 0 | 668 9 10 | 196 10 5 | 7000 11 10 |
| I. | 5000 | 10350 0 0 | 879 12 0 | 258 12 0 | 9211 8 0 |
| K. | 900 | 1863 0 0 | 158 5 9 | 46 9 2 | 1658 1 2 |
| L. | 1000 | 2070 0 0 | 175 15 2 | 51 12 0 | 1842 4 10 |
| M. | 250 | 517 8 0 | 43 15 9 | 12 15 0 | 460 9 2 |
| | 32450 | 67171 8 0 | 5709 9 8 | 1679 4 7 | 59782 10 2 |

RECAPITULATION.

| | Sa. Rs. | A. | Ps. |
|---|---|---|---|
| 32450 Dollars, at 207 Sa. Rs. per 100 | 67171 | 8 | 0 |
| Freight at 8½ per cent. - - | 5709 | 9 | 3 |
| Commissions 2½ " - - - | 1679 | 4 | 7 |
| Net sales remaining for investment | 59782 | 10 | 2 |
| Sa. Rs. | 67171 | 8 | 0 |

Indigo, iron, and salt petre, are sold in Calcutta by the factory maund. Sugar and ginger by the bazar maund.

When the return cargo or investment is on freight, sugar and salt petre are taken per ton in weight; other goods by measure.

The corge of 20 pieces of bale goods consists of three qualities, viz. 5 of A, 7 of B, and 8 of C. Care should be taken that the 2d and 3d qualities be not too inferior in proportion to the first, which are on the top. The difference should not be more than 5 per cent. between the 1st and 2d, and 8 per cent. between the 2d and 3d.

*Bengal indigo* is classed under the following kinds—blue, purple, violet, and copper. The chief signs of good indigo are its lightness and feeling dry between the fingers, its swimming light in water; if thrown on burning coals it emits a violet-coloured smoke, and leaves but little ashes. The large, regularly formed cakes should be preferred, when of a fine, rich, blue colour, externally free from the white adhesive mould, by the incrustations of which the indigo is much depreciated. When broken, it should be of a bright, purple cast, of a close texture, free from specks or sand, and of a shining, copper-like appearance, when rubbed on the nail. The heavy, dull-coloured, and porous should be rejected; likewise the small, broken pieces, which, though equally good in quality with the regularly formed cakes, do not obtain an equal price. What is called the burnt indigo, may be easily known, by its being full of cracks, and its appearing as if the cakes would easily crumble.

Re-manufacturing the inferior kind of indigo has been lately practised, in order to give the cakes a fairer appearance; but in doing it, much of the colouring substance is lost.

## *BOMBAY.*

Accounts are kept in Rupees, Quarters, and Rees.

100 rees make 1 quarter; 4 quarters 1 rupee.

218 rupees were equal to 100 Spanish dols. in April, 1800

The current money is in Mohurs, Rupees, and Pice.

50 pice make 1 rupee; 15 rupees 1 mohur.

The weights are pounds, mauds, and candies; the pound the same as English.

A Bombay maud - - - is 28 lb.
A Surat maud - - - is 37⅓ lb.
21 Surat mauds or 784 lb. make 1 Surat candy.

Cotton is sold by the Surat candy.

Camphor and Mocha coffee are sold by the Surat maud.

Malabar pepper is sold by the Bombay candy of 588 lb.

In 274 bales of cotton, weighing net 996 cwt. 2 qrs. 23 lb. how many Surat candies?

784 lb. = 7 cwt. 7)996 2 23

142 200 two hundreds.
24 excess 12 per cent.
56 2 quarters.
23

303 Ans. 142 can. 303 lb.

## *MADRAS.*

Accounts were kept in Pagodas, Fanams, and Cash.

80 cash make 1 fanam; 36 fanams 1 pagoda.

The Spanish dollars were in 1798 and 1799, at 165 dollars for 100 star pagodas; making the pagoda worth 165 cents. The revenue laws of the United States reckon them at 184 cents.

By a late regulation the silver rupee is the standard coin, and in it public accounts are kept. The star pagodas are changed into rupees at 350 rupees for 100 star pagodas. The new silver rupee is 1*s.* 11*d.* sterling.

400 Madras rupees are equal to 375 Sicca rupees, and to $175.

The picul is 133⅓ lb. English.

100 cattas make a picul.

A maud is 25 lb. Troy; 20 mauds make 1 candy.

The excellence of their cloth is defined by the *threads* in the warp.

The duty payable at the custom-house is 2½ per cent. outwards and inwards. This is taken on imports according to the invoice, and on exports at the actual cost at the bazar or market.

## *JAVA.*

The money of account is the Florin and its parts in stivers, or in centimes. In 1826 the florin was valued at 39½ cents in Samarang.

The picul of 100 cattas is equal to 125 Dutch lbs. or 133⅓ lbs. English.

What will 5188 piculs 11 cattas of coffee come to at $22,24½ cts. per picul, charges included?

Ans. $115393,93.

Great attention is to be paid to the quality of coffee purchased here, if intended for the Dutch market. The best quality is the brown Java, then the yellow, and the least valuable is the pale yellow. A price current from Amsterdam quotes them, viz.

Pale Yellow, 7 stivers, Old Yellow, 8, and Brown Java, 11 stivers per lb. In selecting for the American market, it should be of a green colour, and well cured.

When weighing coffee out of the public stores, great care is necessary, as means are frequently used to deceive in the weight. Through want of such vigilance, there is often a loss of 3 to 5 per cent.

If coffee be purchased, receivable on the coast, it is necessary to be particular in specifying the quality, as it sometimes happens, that an inferior quality is put off in this way. A bond in this case is necessary. The best months on the coast are July, August, and September, before the coffee is sent round to Batavia.

A vessel to obtain a cargo of coffee at Batavia should arrive there in October, November or December. The last company sales are about the middle of January.

Opium is not admitted to be landed in boxes of less than 125 Dutch pounds, but is allowed to be repacked on board.

In stowing sugar, it should not be in contact with coffee, as the flavor of the coffee will be injured by it, and in Holland especially, the taste is much consulted.

## *CANTON.*

| | | | |
|---|---|---|---|
| 10 Cash | - make | - | 1 Candareen. |
| 10 Candareens | - - | - | 1 Mace. |
| 10 Mace | - - | - | 1 Tale. |

The weights are the picul, catty, and tale. The tale is 1⅓ oz. Avoir.

16 tales make 1 catty = $1\frac{1}{3}$ lb
100 catties 1 picul = $133\frac{1}{3}$

The Spanish dollar is current at 72 candareens.

The covid of 10 punts = 14,625 Eng. inches.

In 34506 tales 7 mace and 6 candareens, how many dollars?

| | Or thus, |
|---|---|
| 8)3450676,00 | $\frac{1}{3}$)3450678 |
| 9)431334,75 | $\frac{1}{6}$)1150226 |
| | 191704$\frac{1}{3}$ |
| Ans. $47926,08$\frac{1}{3}$ | $47926,08$\frac{1}{3}$ |

In 209132 lb. Av. how many piculs?

$\frac{1}{4}$)209132
52283

156849

Ans. 1568 piculs 49 catties

How many lb. Av. in 1568 piculs 49 catties?

$\frac{1}{3}$)156849
52283

Ans. 209132 lb.

What will 1568 piculs 49 catties of Tea come to at 22 tales per picul?

1568,49 × 22 = 34506,78
$\frac{1}{3}$ = 11502,26
$\frac{1}{6}$ = 1917,04$\frac{1}{3}$

Ans. $47926,08$\frac{1}{3}$

A captain or supercargo, on his arrival at Whampoa, will procure a permit from the Mandarin to go up to Canton in his own boat, in preference to his going in a Chinese passage boat, as his own boat, with her colours hoisted, is not obliged to stop at the chop-houses, and thus he saves much time and trouble from detention and the opening of baggage.

The Hong merchants, who exercise a summary power in the commerce of this place, consist of a number of persons, selected from the most opulent and respectable merchants of Canton, nominated by the Hippo, or Viceroy, and sanctioned by the Emperor. They are very limited in number, being twelve in 1793, and increased to fourteen in 1803.

They are jointly and individually responsible for each other to the Emperor and to foreigners, trading with them, and no article can be imported or exported without a chop or certificate from a Hong merchant. No foreign ship can enter until a Hong merchant becomes responsible to the Emperor for every person on board, and also for payment of all duties and exactions. This security will not be given by any prudent, solid merchant, without an engagement on the part of the Captain or Supercargo to trade with him to a certain amount; beyond this stipulated sum, he is at liberty to trade as he pleases. But as the ship may remain 12 or 14 days without entering, the captain has sufficient time to ascertain the state of the market, and to select the Hong merchant, who will best accommodate him as to the terms, and the time of furnishing the cargo.

All goods purchased of the Chinese are to be delivered alongside of the ship, free of duty or expense to the purchaser, but it is necessary to guard against the fraudulent attempts of the lightermen, while on their passage to the ship, and also when they are passing the goods on board.

Certain silk goods having been lately made, short of the proper measure, it is now necessary to inspect them closely; since pieces, intended for particular patterns, are much injured in this way. And as some goods, when coloured, especially black, gain in the weight, it is necessary to be particular in this respect when contracting. Thus, should 18 tales white crape be contracted for, to be furnished in black, it should then weigh 19½ tales, to correspond with the agreement.

The Chinese year commences about the beginning of February, at which time all accounts must be settled among merchants, and the balances paid, or else a loss of credit ensues, which with them is a species of bankruptcy. This renders them very desirous of selling the goods they have then on hand, to enable them to comply with their engagements.

As it may sometimes be contemplated, in arranging a voyage beyond the Cape of Good Hope, to send part of the *return cargo* immediately to Europe in the same vessel from the United States, it is important in making the Manifest, to say—*for* ——— *in the United States and for Europe.* In such case the merchant is not obliged to land any more than he wishes, and there is then a saving of time and expense,

and also of the loss that would arise on the drawback, if the goods were landed.

### *MANILLA.*

| | | | |
|---|---|---|---|
| *Money*— | 12 Grains | 1 Rial. | |
| | 8 Rials | 1 Peso, or Dollar. | |
| *Weights*— | 25 lbs. | 1 Arobe. | |
| | 4 Arobes | 1 quintal | = 104 lbs. Eng. |
| | 100 Catties | 1 Picul | = 142 " " |
| *Measures*— | The Vara or Spanish Yard | | = 33½ inches Eng. |
| | " Cavan | | 2¼ bushels " |

The principal articles of this Island, suited to the European or North American market, are sugar and indigo.

" The sugar is brought to market in its raw state, and when clayed produces three qualities, first, second, and third. It is for the advantage of a supercargo, who selects for the European or North American market, to purchase all of the first quality, even at a higher rate, on account of its superior character in those countries, as well as the saving of freight."

The indigo is brought from the provinces in sacks, and is of two kinds, or first and second quality in each sack. Great care and circumspection are requisite in selecting it. It is necessary to examine every cake, when purchased of the natives, "as they are in the habit of mixing other substances with it, such as stones, mud, &c." The shape of the cake is no proof of the quality, as the hard, or what is termed the burnt indigo; being of a more firm or flinty consistence, is more likely to retain its shape.

The first quality is of a deep blue or purple colour, porous, breaks easily, weighs light, and when put into water, should be buoyant, at least two thirds of it should be above the surface. It is the more necessary to try it in this way, as one mode of deception, practised by them, "is to keep it for some time before delivery in a damp vault or cellar to increase its weight by absorption of moisture, to which its porosity renders it pervious. The best indigo is produced in the Laguna or Lake district."

### *COLUMBO, ISLE OF CEYLON.*

The money is in paper, silver, and gold.

Paper money is in the bills of the Company, and is of uncertain value.

Silver is in the rupees of the different parts of India.

The Sicca rupee is worth more than any other by 7 to 8 per cent.

Gold is the Mohur pagoda.

The exchange is various, as silver is rarely seen.

| | | | |
|---|---|---|---|
| 6 stivers | make | | 1 shilling Flemish. |
| 8 shillings | - | - - | 1 rix dollar. |
| 30 stivers | - | - - | 1 rupee. |
| 64½ do. | - | - - | 1 Spanish dollar. |

## *JAPAN.*

Accounts are in Tales, Mace, and Candareens.

10 candareens make 1 mace.

10 mace - - - 1 tale = ⅔ of a dollar, or 75 cents.

10 mace are equal to 1 rix dollar.

6 tales make a corban, a gold coin not used in accounts

*In Weights*—10 tales make 1 mace; 16 mace 1 catta

The ichan or hickey is 3½ feet.

The balee is 65 quarts.

Thirty-five per cent. was the duty on privileged imports in 1799. It is on the exports (which are all free of duty) that the Dutch make their profit upon their return to Batavia. A privilege is granted to the captains of the Dutch ships to carry money, which often sells at an advance.

The returns for the Dutch Government vessels is mostly in copper, which is esteemed the best in the world. This is chiefly shipped to Madras and Calcutta, as remittance for goods. It is packed in boxes of one picul each.

How much is the net proceeds of 4 silver watches, at 35 tales each, deducting the duty of 35 per cent.?

35 tales.
4

140
35 per cent.

700 Sales 140
420 Duty 49

49,00 Ans. net proceeds 91 tales.

## FORM OF AN ACCOUNT OF SALES.

| | | Duties. | Net. |
|---|---|---|---|
| | *tales.* | *tales.* | *tales.* |
| 4 silver watches, 1st kind | 35 | 49 | 91 |
| 6 silver watches, 2d kind | 23,1 | 48,5,1 | 90,0,9 |

The article is given in the first column, the price in the next column, the duties in the third, and the net proceeds in the fourth.

## WEST INDIES.

### *JAMAICA AND BERMUDAS.*

Accounts are kept in Pounds, Shillings, and Pence.

The Spanish dollar passes at 6*s*. 8*d*.—3 dollars make £1.

*To change Jamaica currency to Federal money.*

Rule. Multiply the pounds by 3 for dollars. If there be shillings, &c. increase the pence in the given sum by $\frac{1}{4}$ for cents.

Example.

Change £54 12 11 Jamaica currency to Federal money.

£54 12 11 = 13115 pence.

$\frac{1}{4}$ = $3278\frac{3}{4}$

Ans. $\$163,93\frac{3}{4}$

| | |
|---|---|
| 102896 feet of Boards at £15 per M. | £1543 8 9 |
| 8519 lbs. of Sugar at 70*s*. per 100. | 298 3 3 |
| 5 hhds. Sugar, Gross 86 cwt. 2 0 tare 585 lb. at 75*s*. per 100, and 5 hhds. at 30*s*. | 348 17 3 |

### *BARBADOES.*

The Spanish dollar is 6*s*. 3*d*. currency.

*To change Barbadoes currency to Federal money.*

Rule. Increase the pence in the given sum by $\frac{1}{3}$ for cents.

Example.

Change £49 11 10 to Federal money.

£49 11 10 = 11902*d*.

$\frac{1}{3}$ more 3967

Ans. $\$158,69\frac{1}{3}$

Proof 15869$\frac{1}{3}$ cents.

$\frac{1}{4}$ less 3967$\frac{1}{3}$

11902 pence.

## *MARTINICO.*

The money of account is in the Franc of 100 centimes.
The Franc is valued at - - - 18 cents.
The Livre - - - - - - - 10 "
45 Livres are equal to - - - - 25 Francs.
The Current dollar is - - - - 90 cents.
The Round dollar - - - - $5\frac{40}{100}$ Francs.

The difference between them is *there* said to be 10 per cent. in favour of the Round dollar. It is therefore necessary, if the bargain be made in dollars, to ascertain the kind before contracting. Stating it in Francs would prevent any difficulty.

The Kilograme is $2\frac{1}{5}$ lb. Avoir. 100 Kilos. = 220 lbs.
The Hectolitre is $2\frac{4}{5}$ Bushels.

## *GUADALOUPE.*

185 Livres Guadaloupe currency = 100 Francs.
A Spanish dollar is 10 Livres Currency.
A Current dollar is 9 do. do.
A Spanish Doubloon is 16 Spanish dollars, or 160 Livres
A Guinea " 49 Livres 10 Sous.
A Joe of 3 drams 54 grains = $85\frac{1}{4}$ Livres.

All kinds of gold pass current. Portuguese and Spanish gold is at $22\frac{1}{4}$ Livres per dram of 72 grains.

American gold at $20\frac{1}{4}$ livres per dram of 72 grains.

## *CUBA, PORTO RICO, TRINIDAD.*

Accounts are kept in Havana in Dollars and Rials, reckoning 8 Rials plate, or 20 Rials vellon to the dollar.

The par with London is $444 per £100.
" " " France is 5 Francs per dollar.

On the south side of the island,—St. Jago and Trinidad, Doubloons pass at $16, in lieu of $17, as on the North—Havana and Matanzas.

The Spanish Arobe is 25 lbs. 4 Arobes make a quintal.
100 lbs. Spanish = 104 English.
108 Varas = 100 yards English.
140 " = 100 French Ells

One Fanaga is 3 bushels nearly, or 200 lbs. Spanish.

The Tonnage duty on Foreign vessels is 20 Rials or $2\frac{1}{2}$ per ton.

The keg of $5\frac{1}{2}$ gallons in Havana is considered to make but 5 gallons in the United States. The loss on the gauge or measure being about 10 per cent.

In buying white or yellow sugar, there is an augmentation of $\frac{1}{2}$ to 1 Rial per arobe on either quality, according to the

demand for that particular one. The shipping charges are always the same. White being valued at 12 rials, and brown at 8 rials per arobe.

What will 42 bbls. of white Havana sugar come to, weighing gross 415 Ar. 18 lbs. Tare and tret on the whole 858 lbs. at 26 rials per arobe?

| | Ar. | lb. |
|---|---|---|
| | 415 | 18 |
| 858 lb. = | 34 | 8 |
| | 381 | 10 |
| | 26 | |
| | 2286 | |
| | 762 | |
| 10 lbs. = $\frac{2}{3}$ Ar. | 10 | |
| | 8)9916 Rials. | |
| Ans. | $1238 | 4 |

What is the export duty on 1500 arobes of assorted sugars, $\frac{3}{5}$ White, and $\frac{2}{5}$ Brown, valued at 12 and 8 rials, at $6\frac{3}{4}$ per cent.?

$\frac{3}{5}$ of 1500 = 900 at 12 rials = $1350
$\frac{2}{5}$ of 1500 = 600 at 8 " = 600
1950
At $6\frac{3}{4}$ per cent.
Ans. $131,62$\frac{1}{2}$ cents.

| | | | dls. | rls. |
|---|---|---|---|---|
| 125 | pieces bretagnes at | 26 reals - - - | 406 | 2 |
| 500 | do. do. | 24$\frac{1}{2}$ do. - - - | 1531 | 2 |
| 80 | umbrellas - | 6$\frac{1}{2}$ dollars - - | 520 | 0 |
| 147 | arobes of butter | 25 do. per 100 lbs. - | 918 | 6 |
| 2405 | do. of 19 lb. sugar | 25 reals per arobe - | 7518 | 0 |
| 1660 | do. 12 lb do | 21 do. do. - | 4358 | 7 |
| 6695 | feet boards - | 40 dols. per M. - | 667 | 6 |

## *PORTO RICO.*

The current money is the Spanish dollar and its parts of $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{16}$, under their Spanish names.

There is often a premium of 10 to 15 per cent. on the doubloon of $16, nominal value.

## *ST. THOMAS.*

Merchants generally state their accounts with the Americans in dollars and cents—but the currency consists of real

and imaginary moneys. The real are stivers, bits and two-bit pieces. The doubloon with the parts, viz. $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{16}$. The stiver is a brass coin, of which there are 75 to a dollar. The bit is a coin, part silver and part brass, and equal in value to 5 stivers. The two-bit piece is of the same metal, twice as large and double in value to the other. The doubloon goes by weight and passes for $16, if it weighs a Spanish dollar. The parts of the doubloon pass at the nominal value.

### *ST. MARTINS.*

On the French or south side of the island, the government standard of France is the money of account; but sales are frequently made for dollars, which have to each, 8 bits, of 6 stivers each.

Four twenty cent pieces with heads pass for a dollar, giving only eighty cents to the dollar.

On the Dutch side, 6 stivers make a bit, 8 bits are called a piece of Eight—12 bits make a current dollar—15 bits make a Spanish dollar. There are small pieces of silver, or 5, 6, 9, and 10 stiver pieces. The value of the doubloon depends on the plenty or scarcity of money. It is generally at 19 to 20 dollars.

The English measures are used in buying and selling on both sides of the island.

The Dutch 100 lbs = 110 lbs. English.

### *ST. EUSTATIA.*

This place has the same currency as the Dutch side of St. Martins.

### *BRAZIL—RIO JANEIRO.*

The standard or par value of a Spanish dollar was formerly considered at 800 reis, but it is now enhanced by Government to 960 reis, by the coinage of the dollar bearing that value in Bank Paper.

The quintal is 4 arobes of 32 lbs. each, 100 lbs. = 102$\frac{1}{2}$ lbs. Eng.

The Vara is 43$\frac{1}{2}$ inches, the Covado = 26$\frac{3}{4}$ inches.

180 Medidas = 140 gallons, 12 alquiers = 13 W. bushels.

*Sugars.*—The best sugars are those which come earliest to market. Age makes a material alteration in the quality by rendering them damp, and destroying the crystallization.

The crop generally begins to appear in October, and by February following it is nearly all brought in.

*Coffee.*—The greater part of the crop is exported from July to December, during which period, the quality is better than that which comes to market in other months. Coffee embarked on board vessels partly laden, generally loses colour. When vessels are entirely full, this complaint is seldom made.

The custom of this port is, that the expense of landing and taking in cargo on freight, is payable by the vessel, unless expressly stipulated to the contrary in the bills of lading, or by special contract.

*Hard Spanish dollars* should be expressed in contracts for freight, when that coin is bargained for; and the vague expression of $ must be avoided, as it leads to many disputes.

No vessel should be chartered to this place, having less than *thirty working lay-days, exclusive of Sundays and holy-days*, and those carrying 1000 barrels or upwards should in no case have less than 60 lay-days.

500 hides of 28 lb. each, purchased here, cost on board Reis 2277,795, which amount, with $2\frac{1}{2}$ per cent. commission for endorsing and negotiating the bill, was drawn for on London at 50*d.* for 1000 reis. The remittance from the United States to meet this sum being made, when bills on London were at $\$4\frac{89}{100}$ per £. Required the actual cost in the United States of the hides per lb. on board at Rio Janeiro.

100—2,50=97,50 : 100 : : 2277,795 : 2336,200

1000 : 50*d.* : : 2336,200 : £486 14*s.* 2*d.*

486

489 cts

237654

244 for 10*s.*

500 98 " 4

28 4 " 2*d.*

14000)238000(17

14

98

98

Ans. 17 cts. per lb.

## ARBITRATION OF EXCHANGE.

When the rates of exchange between several countries in succession are given, to find the rate of exchange between the first and last place in the correspondence.

RULE. Find by proportion the value of the sum originally remitted in the different moneys of the countries through which it passes according to the rates of the different exchanges, and so proceed till the whole is finished. Or,

Multiply all the first terms of the different statings together for a divisor, and the second terms, together with the sum remitted, for a dividend, and the quotient is the amount received in the denomination of the last place in the correspondence; from this result the rate of exchange is readily found by proportion.

### EXAMPLES.

1. A merchant in London has credit for 500 piastres in Leghorn for which he can draw directly at 52*d.* sterling per piastre, but choosing to have it remitted by a circular rout, they are sent, by his order, to Venice at 95 piastres for 100 ducats banco; from thence to Cadiz at 350 maravadies per ducat banco; from thence to Lisbon at 630 reas per piastre of 272 maravadies; from thence to Amsterdam at 48*d.* Flemish for 400 reas; from thence to Paris at 54*d.* Flemish per crown; and from thence to London at 30*d.* sterling per crown: What is the arbitrated price between London and Leghorn per piastre, and what is gained or lost by this circular remittance, without reckoning expenses?

| *piast.* | *d. ban.* | | *piast.* | *d. ban.* |
|---|---|---|---|---|
| 95 : | 100 | : : | 500 : | $526\frac{6}{19}$ in Venice. |
| *d. b.* | *mar.* | | *d. b* | *mar.* |
| 1 : | 350 | : : | $526\frac{6}{19}$ : | $184210\frac{12}{19}$ in Cadiz. |
| *mar.* | *reas.* | | *mar* | *reas.* |
| 272 : | 630 | : : | $184210\frac{10}{19}$ : | 426664 in Lisbon. |
| *reas.* | *d. fl.* | | *reas.* | *d. fl.* |
| 400 : | 48 | : : | 426664 : | $51199\frac{1}{4}$ in Amsterdam. |
| *d. fl.* | *cr.* | | *d fl.* | *cr.* |
| 54 : | 1 | : : | $51199\frac{1}{4}$ : | $948\frac{5}{36}$ in Paris. |
| *cr.* | *d. st.* | | *cr.* | £ *s. d.* |
| 1 : | 30 | : : | $948\frac{5}{36}$ : | 118 10 $4\frac{1}{4}$ sterling. |

By the Chain Rule.

| *Antecedents.* | | *Consequents.* |
|---|---|---|
| | | 500 Piastres. |
| 95 Piastres | = | 100 Ducats. |
| 1 Ducat | = | 350 Maravadies. |
| 272 Maravadies | = | 630 Reas. |
| 400 Reas | = | 48 *d.* Flemish. |
| 54 *d.* Flemish | = | 1 Crown. |
| 1 Crown | = | 30 *d.* Sterling. |

Product of Consequents = 15876000000

" Antecedents = 5881|4400 = £118 10 4½

The calculation may be abridged by omitting such antecedents and consequents as are alike, and reducing such as admit of a common measure, to the lowest term, as in vulgar fractions. The demand may be placed at the bottom instead of the top as above: The result would be the same.

| | £ | *s.* | *d.* |
|---|---|---|---|
| Amount received by circular remittance | 118 | 10 | 4¼ |
| 500 piastres at 52*d.* - - - - | 108 | 6 | 8 |
| Ans. { Gained by circular remittance - | £10 | 3 | 8¼ |
| Arbitrated value of a piastre by ditto | 56$\frac{1777}{2000}$*d.* | | |

"It is very easy to fancy problems and theories in Compound Arbitration, where great advantages might be made by numerous combinations of exchange, but seldom does any opportunity occur in practice of realizing such speculations. On the contrary, men of experience are satisfied with combining the exchanges of three places only, and there are few instances of the kind that will not afford room for a reasonable profit."

*Comparative values of English, French, Spanish, and United States' Coins.*

The fineness of English and United States' gold being 22 carats, or $\frac{11}{12}$, an ounce of it must contain 440 grains pure and 40 grains alloy; and it is minted into £3 17*s.* 10½*d.* or 934½ pence: therefore, as 934.5*d.* : 240*d.* :: 440 : 113.0016 grains, the weight of pure gold in one pound sterling or gold sovereign.

The United States' gold eagle contains 247½ grains pure and 22½ grains alloy; therefore, as 113.0016 : 247.5 :: 240*d.*

: 525.657*d.* the sterling value in British gold of one eagle: hence, that of the dollar is 52.5657*d.* or 4*s.* 4.5657*d.*

Again: the standard fineness of British silver is $\frac{37}{40}$: therefore, 1*oz.* of it must contain 444 grains pure and 36 grains alloy, and is minted into 5*s.* 6*d.* or 66 pence.

The United States' and Spanish dollar contain 371¼ grains pure and 44¾ grains alloy, the fineness in each being $\frac{1485}{1664}$: therefore, as 444 : 66, or 74 : 11 :: 371.25 : 55.1858=4*s.* 7.1858*d.* the value of the dollar in sterling silver: hence, as 52.5657 : 55.1858 :: 100 : 104.985, or 5 per centum nearly, the difference of its value in sterling gold and silver.

Again: as 11 :: 74 : 240*d.* : 1614.5444 grains of pure silver in one pound sterling or British sovereign.

Again: since 4*s.* 6*d.* is $\frac{9}{40}$ of a pound sterling, it will be as $\frac{9}{40}$ : 1 :: 1 : 4.44$\frac{4}{9}$, differing from the estimated par of one pound $4,44, by $\frac{4}{9}$ per centum; and as 66*d.* : 54*d.* :: 444 : 363¾ grains pure silver in 4*s.* 6*d.* which is 7$\frac{4}{44}$, almost 8 grains less than 371¼ grains, the quantity in one dollar.

As 113.0016 : 1614.5454 :: 1 : 14.288, the ratio of the value of silver to gold in the British monetary system; and as 24.75 : 371.25 :: 1 : 15, the ratio of the same in the coins of the United States. Therefore, it will be as 14.288 : 15 :: 100 105$\frac{1}{2}$, or more than 5 per cent. difference in the comparative values of silver.

Again: as 416 : 480 :: $1 15.38 : $1.2929, the value of 1 *oz.* do. pure silver: hence, 1 grain of these is value for .002404 and .0026936 of a dollar, respectively. Also, as 247.5 : 440 :: $10 : $17$\frac{7}{9}$, the value of one ounce United States' gold; and as 11 : 12 :: 17$\frac{7}{9}$ : $19$\frac{2}{3}$, the value of one ounce do pure. Hence one grain is worth .040404.

Again: as 113.0016 : 440 :: £1 : £3 17*s.* 10½*d.* the value of one ounce sterling gold; and as 11 : 12 :: £3 17*s.* 10½*d.* : £4 4*s.* 11.45*d.* the sterling value of 1 *oz.* pure gold. Likewise, as 37 : 40 :: 66*d.* : 71¼*d.*=5*s.* 11¼*d.* the value of one ounce pure silver in sterling money.

The kilogramme is equivalent to 15434 grains Troy; and a kilogramme of French standard gold, $\frac{9}{10}$ fine, is minted into 77½ forty-franc pieces of gold: hence, one gold franc must contain 4.48084 grains of pure gold: therefore, as 113.0016 : 4.48084 :: 240*d.* : 9.5167*d.* sterling, the British value of the gold franc in British gold. Again: the kilogramme of French standard silver, $\frac{9}{10}$ fine, is minted into 200 francs: hence, the pure silver in one franc is 69.453

grains; therefore, as 74 : 11 :: 69.453 : 10.324*d.* the value of the silver franc in British silver.

Lastly: as 247.5 : 4.48084 :: $10 : 18 $\frac{14}{100}$ cents, the value of the gold franc in United States' gold; and as 371.25 : 69.453 :: $1 : 18$\frac{708}{1000}$ cents, the value of the silver franc in United States' silver; and as 4.48084 : 69.453 :: 1 : 15.5, the ratio of the value of silver to gold in the monetary system of France.

The British copper penny is the twenty-fourth part of one pound avoirdupois, or of 7000 grains Troy: hence, one penny must weigh 291$\frac{1}{4}$ grains, and it is estimated $\frac{54}{100}$ of our dollar: therefore, as 1*d.* : 54 :: 291$\frac{1}{4}$ grains: 157$\frac{1}{4}\frac{1}{0}$ grains, the proportional weight of one cent. But the United States' cent weighs 208 grains, being nearly 50$\frac{3}{4}$ grains more than its equivalent in British copper coin: that is, about 32$\frac{1}{4}$ per centum; and as 208 : 7000 :: 1 : 33$\frac{17}{26}$ cents per pound Avoirdupois, the value of the copper; consequently, when the market price of copper exceeds 34 cents per pound, cents will disappear, as eagles and dollars do when their market price exceeds their mint value.

---

*A TABLE of silver coins, with the weight of pure silver in each, as determined by assays at the London and Paris mints, and their corresponding values in cents—371$\frac{1}{4}$ grains being worth one dollar.*

| *SILVER COINS.* | *Pure silver. Weight in grains.* | *Value in cents.* |
|---|---|---|
| Austrian Rix Dollar | 355.5 | 95.758 |
| Denmark do. | 388.4 | 104.620 |
| English Crown | 429.7 | 115.744 |
| Franc (1818) | 69.4 | 18.694 |
| Geneva Patagon | 351.0 | 94,545 |
| Genoa Scudo | 565.5 | 152.324 |
| Hamburgh Rix Dollar | 397.5 | 107.070 |
| Hanover Florin | 200.3 | 53.953 |
| Holland do. | 146.8 | 39.541 |
| Lubec Rix dollar | 391.9 | 105.561 |
| Milan Scudo | 319.6 | 86.088 |
| Naples Ducat | 295.4 | 79.569 |
| Poland Florin | 84.0 | 22.626 |
| Portugal Crusado | 198.2 | 53.387 |

| SILVER COINS. | Pure silver. Weight in grains. | Value in cents. |
|---|---|---|
| Russian Rix dollar - - - - | 359.0 | 96.700 |
| do. Florin - - - - | 198.4 | 53.441 |
| Roman Scudo - - - - | 371.5 | 100.057 |
| Russian Rouble of Peter the Great - | 312.1 | 84.068 |
| do. Cctharine I. - | 309.9 | 83.474 |
| do. Peter II. - - | 310.0 | 83.502 |
| do. Anne - - | 317.2 | 85.441 |
| do. Elizabeth - - | 321.8 | 86.679 |
| do. Peter III. - - | 277.5 | 74.748 |
| do. Catharine II. - | 275.9 | 74.316 |
| do. Paul - - - | 280.8 | 75.636 |
| do. Alexander - - | 278.1 | 74.909 |
| Russian 10 copec piece (1802) - | 28.3 | 7.623 |
| do. 5 do. (1801) - | 15.3 | 4.121 |
| Sardinian Scudo - - - - | 324.7 | 87.460 |
| Saxon Rix dollar - - - - | 358.2 | 96.485 |
| One-sixth Thaler (1808) - - | 42.1 | 11.340 |
| One-sixth Thaler of Jerome (1809) - | 43.7 | 11.771 |
| Netherland Florin - - - - | 148.4 | 39.973 |
| Parma Ducat - - - - | 357.9 | 96.404 |
| Sicilian Scudo - - - - | 348.2 | 93.791 |
| do. Piece of 40 grains - - | 117.5 | 31.650 |
| do. do. 20 do. - - | 59.1 | 15.919 |
| Sierra Leone Company's 10 macutas | 330.8 | 89.004 |
| do. do. piece of 5 macutas | 167.4 | 45.091 |
| do. do. do. 2 do. | 65.0 | 17.508 |
| do. do. do. 1 do. | 32.5 | 8.754 |
| Spanish old square Mexican dollar - | 376.1 | 101.306 |
| do. Seville dollar - - - | 376.1 | 101.306 |
| do. old Mexican Peceta (1736) - | 93.6 | 25.212 |
| do. Real of Mexican Plate (1746) | 46.8 | 12.606 |
| do. Mexican dollar with globes (1765) | 377.4 | 101.656 |
| do. Real of Plate (1721) - - | 35.9 | 9.670 |
| do. Real (new) do. (1795) - | 36.1 | 9.724 |
| do. Dollar, (late coinage) - | 370.9 | 99.905 |
| do. Half dollar, do. - - | 185.4 | 49.940 |
| Swedish Rix dollar - - - | 388.5 | 104.647 |
| do. Double Platt, or piece of 2-3 | 259.6 | 69.926 |
| do. Piece of 8 skillings - - | 63.8 | 17.185 |
| Switzerland Rix dollar - - - | 360.1 | 96.997 |
| Florin of Lucerne - - - - | 96.8 | 26.074 |

| *SILVER COINS.* | *Pure silver. Weight in grains.* | *Value in cents.* |
|---|---|---|
| Treves Rix dollar | 359.0 | 96.700 |
| Turkey Piastre (1801) | 95.7 | 25.778 |
| do. do. (1818) | 67.7 | 18.236 |
| Tuscany Lira (1803) | 53.4 | 14.284 |
| Scudo Pisa of Etruria | 385.0 | 103.704 |
| Venice Scudo of 10 lire | 365.2 | 98 371 |
| do. do. 2 do. | 32.8 | 8.835 |
| Wurtburg Rix dollar | 359.7 | 96.888 |
| Wirtemberg do. | 359.1 | 96.727 |
| Zurich do. | 329.3 | 88.700 |
| do. piece of 20 schillings | 57.6 | 15.515 |
| Fanan of Pondicherry | 35.0 | 9.428 |
| do. of Bombay | 22.8 | 6.141 |
| Rupee of Benares | 168.9 | 45.495 |
| do. Calcutta | 175.9 | 46.380 |
| do. Bombay or Surat (1818) | 164.7 | 44.363 |
| do. Madras (old) | 164.8 | 44.390 |
| do. Chanderree | 159.5 | 42.963 |
| do. Mysore, or New Holker | 163.1 | 43.933 |
| do. Parsia. (1789) | 173.9 | 46.841 |
| do. Madras (1818) | 165.0 | 44.444 |
| Dutch East India Guilder (1820) | 148.4 | 38.973 |

The numbers in the first column of the above table are taken from the table of coins in *Kelly's Cambist*, vol. ii. page 162; those in the second are formed by multiplying the respective numbers in the first by .26936, the value of 1 grain of pure silver according to the standard value of the United States' silver coin.

[*Treasury Reports.*

---

*A TABLE containing the values of moneys of account of different nations, expressed in hundredths of the United States' silver dollar; with their equivalent weight of pure silver, as valued in the United States' standard coin.*

| *CURRENT MONEY.* | *Weight of pure silver in grains.* | *Value in cents.* |
|---|---|---|
| Aix-la-Chapelle Rix dollar courant | 224.86 | 60.567 |
| Alicant Libra or Peso | 282.15 | 76.100 |
| Amsterdam Rix dollar | 376.25 | 101.346 |
| do. Florin (old) | 150.38 | 40.506 |
| do. do. (new) | 148.38 | 39.967 |
| do. Pound Flemish | 890.29 | 239.808 |
| Antwerp Pound Flemish of exchange | 882.63 | 237.745 |

| CURRENT MONEY. | Weight of pure silver in grains. | Value in cents. |
|---|---|---|
| Antwerp Floren of exchange - | 147.09 | 39.619 |
| do. Pound Flemish courant - | 756.60 | 230.798 |
| do. Florin courant - - | 126.04 | 33.949 |
| Arragon Libra jaguesa - - | 352.69 | 95.001 |
| Augsburg Florin giro of exchange | 229.16 | 61.726 |
| do. do. courant - - | 180.46 | 48.609 |
| Barcelona Libra catalan - - | 201.52 | 54.281 |
| Basil Rix dollar, or Ecu of exchange | 338.51 | 91.182 |
| do. do. courant - - | 304.04 | 81.885 |
| Bergamo Scudo of 7 lire - - | 255.44 | 68.806 |
| Berlin Pound Banco - - - | 338.37 | 91.143 |
| do. Rix dollar courant - - | 257.81 | 69.443 |
| Bern Ecu of 3 livres - - | 305.36 | 82.252 |
| do. Crown of 25 batzen - - | 254.44 | 68.536 |
| Bologna Lira Courant - - - | 77.77 | 20.948 |
| do. do. money of exchange - | 79.63 | 21.449 |
| Bolsano Florin giro of exchange - | 238.18 | 64.156 |
| do. do. current - | 180.46 | 48.609 |
| Bremen Rix dollar courant - - | 270.70 | 68.915 |
| Canary Isles Real courant - - | 28.19 | 7.593 |
| Cassel Rix dollar courant - - | 270.70 | 68.915 |
| Cologne Rix dollar specie - - | 224.72 | 60.529 |
| do. do. courant - - | 219.14 | 59.027 |
| Constantinople Piastre, or dollar of 1819 | 67.67 | 18.227 |
| Dantzic Guilder or Florin - - | 64.45 | 17.360 |
| Denmark Rix dollar specie - - | 391.86 | 105.551 |
| do. do. Sundis specie | 381.05 | 102.634 |
| do. do. Crown money | 346.39 | 93.302 |
| do. do. Danish currency | 317.04 | 85.397 |
| do. do. Holstein do. | 313.52 | 84.450 |
| England* Pound sterling - - | 1718.71 | 462.940 |
| Florence Lira - - - - | 58.15 | 15.663 |
| do. Ducat, or Crown courant | 407.05 | 109.642 |
| France Livre Tournois - - | 68.60 | 18.478 |
| do. Franc (new system) - - | 69.46 | 18.710 |
| Frankfort Rix dollar, convention money | 270.70 | 68.915 |
| do. Muntze - | 225.58 | 60.762 |
| Geneva Lire - - - - | 115.51 | 31.114 |
| do. Florin - - - - | 32.94 | 8.873 |

* Gold being the standard measure in England, the Pound sterling is $4.56.57 in United States' gold or silver—1 to 15.

| CURRENT MONEY. | Weight of pure silver in grains. | Value in cents. |
|---|---|---|
| Genoa Lira fuori banco | 57.22 | 15.413 |
| do. Pezza, or Dollar of exchange | 328.85 | 88.577 |
| do. Scudo, or Crown of exchange | 266.81 | 71.868 |
| do. Scudo d'oro marchi | 612.22 | 164.908 |
| Germany Rix dollar courant | 270.70 | 68.915 |
| do. do. specie | 360.92 | 97.217 |
| do. Florin of the empire | 180.46 | 48.608 |
| do. do. Muntze | 150.38 | 40.506 |
| Hamburg Marc banco at medium) | 130.47 | 35.144 |
| do. Pound Flemish banco | 978.59 | 263.593 |
| do. Marck courant | 106.13 | 28.587 |
| do. Pound Flemish courant | 795.98 | 214.404 |
| Hanover Rix dollar, in cash | 299.78 | 80.747 |
| do. do. in gold value | 279.29 | 75.229 |
| Ireland, Pound Irish | 1586.51 | 427.343 |
| Konigsberg Guilder or Florin | 85.94 | 23.149 |
| Leghorn Pezza of 8 reals | 331.21 | 89.216 |
| do. Lira moneta buona | 58.22 | 15.682 |
| do. do. lunga | 55.79 | 15.027 |
| Leipsic Rix dollar, convention money | 270.70 | 68.915 |
| Lucca Lira | 52.99 | 24.273 |
| do. Scudo d.oro | 397.45 | 107.056 |
| do. Scudo currente | 370.95 | 99.918 |
| Malta Scudo or crown | 152.68 | 41.126 |
| Milan Lira imperiale | 74.55 | 20.067 |
| do. Lira currente | 53.35 | 14.370 |
| do. Scudo imperiale | 436.12 | 117.473 |
| do. Scudo currente | 303.06 | 81.632 |
| Modena Lira | 26.64 | 7.176 |
| Munich Guilder or Florin | 150.38 | 40.506 |
| Nanci Livre (money of Lorraine) | 52.85 | 14.236 |
| Naples Ducato di Regno | 295.04 | 79.472 |
| Navarre Real | 35.08 | 9.449 |
| do. Libra | 58.72 | 15.816 |
| Neufchatel Livre tournois | 97.61 | 26.292 |
| do. do. faible | 39.03 | 10.413 |
| Novi Scudo d'oro marche | 607.22 | 163.559 |
| Portugal Milrea | 412.90 | 111.222 |
| Parma Lira | 16.83 | 4.533 |
| Persia Tornan of 100 marmodies | 2059.59 | 554.750 |

| CURRENT MONEY. | Weight of pure silver in grains. | Value in cents. |
|---|---|---|
| Poland Guilder or Florin - - | 43.18 | 116.309 |
| Riga Rix dollar, Alberts - - | 376.26 | 101.349 |
| do. do. currency (agio 40 pr. ct.) | 268.76 | 72.393 |
| Rome Scudo or crown - - - | 372.75 | 100.403 |
| do. Scudo di stampa d'oro - | 568.39 | 153.102 |
| St. Gall Florin, money of exchange | 196.50 | 52.923 |
| do. do. courant - - | 163.09 | 43.929 |
| St. Remo Lira - - - - | 60.58 | 16.318 |
| Sardinia do. - - - - | 130.41 | 35.128 |
| Sicily Ounce - - - - | 884.70 | 238.302 |
| do. Scudo - - - - | 351.05 | 94.580 |
| Spain, Real of old plate - - | 34.95 | 9.414 |
| do. Real of new plate - - | 37.10 | 9.993 |
| do. Real of Mexican plate - | 46.30 | 12.471 |
| do. Real vellon - - - | 18.55 | 4.997 |
| do. Dollar of old plate - - | 279.29 | 75.229 |
| Straalsund Rix dollar of account - | 203.02 | 54.685 |
| do. Pomeranian Guilder - | 101.55 | 27.354 |
| Strasburg Florin - - - - | 136.64 | 36.805 |
| Sweden Rix dollar - - - | 396.81 | 106.884 |
| Switzerland Franc (new system) - | 158.55 | 42.708 |
| Trieste Florin, Austrian currency - | 180.46 | 48.609 |
| do. Lira, Trieste currency - | 34.09 | 9.182 |
| do. Lira di Piazza - - - | 33.30 | 8.970 |
| Turin Lira - - - - - - | 80.78 | 21.759 |
| Venice Lira piccola (of the old coin) | 36.31 | 9.781 |
| do. do. (Austrian) - | 30.44 | 8.199 |
| Vienna Florin - - - - - | 180.46 | 48.609 |
| Zante Lira - - - - - | 29.07 | 7.830 |
| Zurich Florin, money of exchange | 185.12 | 49.864 |
| do. Florin courant - - - | 168.29 | 45.331 |

N. B. The numbers in the first column of the foregoing table are deduced from the sterling values of moneys of account, as given by *Kelly*, vol. ii. page 249, and are found by multiplying said values, in pence, by 7.1613, the grains of pure silver worth one penny sterling. The numbers in the second column are found by multiplying those in the first by .26936.

[*Treasury Reports.*

## AMERICAN DUTIES

Are calculated as in the following

EXAMPLES.

1. What is the duty on 2 hhds. of brown Sugar, weighing gross 2425 lbs. draft 7 lb. per hhd. tare 12 per cent. and duty 3 cents per lb.?

2425
2×7= 14 draft.
2411
12 per ct = 289 tare.
2122 net.
3
Ans. $63,66

2. What is the duty on 2 bags Havana Sugar, weighing 285 lb. gross, draft ½ per cent. tare 2 per cent. and duty 5 cents per lb.?

285
½ per cent. = 1 draft.
284
2 per ct. 6 tare.
278 net.
5
Ans. $13,90

3. What is the duty on 6 puncheons of Rum, containing, viz.

709 gals.
wants 27
682
Allowed for leakage 14 or 2 per cent.
668 net at 42 cts. $280,56 for duty.

Deduct if exported.
3 per cent. of the duties $8,42
2 cents on each gallon 13,36
21,78
$258,78 for drawback.

*Tares allowed at the Custom-House*

On Sugar, in boxes, 15 per cent.; in casks, 12 per cent.; in bags or mats, 5 per cent.—Coffee, in casks, 12; in bags, 2; and in bales, 3 per cent.—Cotton, in bales, 2; and in serroons, 6 per cent.—Cocoa, in casks, 10; and in bags, 1 per cent.—Pepper, in casks, 12; in bales, 5; and in bags 2 per cent.—Green Teas, 20 lb. per chest; Souchong, over 100 wt. 22 lb. per chest; Bohea, whole chest, 70 lb.; half do. 36 lb.; quarter do. 22 lb.—Leakage on Spirits 2 per cent.

*The mode of estimating ad valorem rates of duty.*

The ad valorem rates of duty, upon goods, wares and merchandises, at the place of importation, shall be estimated by adding 20 per cent. to the actual cost thereof, if imported from the Cape of Good Hope, or from any other place beyond the same, and 10 per cent. on the actual cost thereof, if imported from any other place or country, including all charges; commissions, outside packages and insurance excepted.—(*See Laws of the United States.*)

"The fluctuating value of Exchange on London at the time and place of shipment, is the standard which the Treasury and Collectors take for most of the moneys, not rated specifically by law.—In entering goods at the Custom-House, the value of each package should be put *separately* in the Entry; and at the short price. If there was any discount allowed to the owner, in payment made for the same before their shipment, and the true value, if the owner is the manufacturer in whole or in part, without any discount."

4. What is the duty on one bale of Linen Diapers from St. Petersburg, the cost there being 710 Rubles 50 Copecs, each at 10½*d.* sterling duty at 15 per cent.?

Ans. $22,77.

5. How much is the duty on one bale of cloth from Bremen, which cost 400 rix dollars, at 75 cents each, the duty at 25 per cent.? Ans. $82,50.

6. Three cases of goods from Paris cost, viz.

| | | | |
|---|---|---|---|
| 1 case | Levantines - - - | francs | 1200,00 |
| 1 " | Artificial Flowers, Essences, &c. | | 600,30 |
| 1 " | Watches, Jewelry, &c. - - | | 2500,75 |

The duty on watches, &c. is 7½, on silks, &c. 15, and on flowers, &c. 30 per cent. Required the amount of duty?

| | fs. | cts. | $ | | $ |
|---|---|---|---|---|---|
| Cost of watches, &c. | 2500,75 | at 18¾ | 468,89 | | |
| | | 10 per ct. | 46,89 | | |
| | | | $515,78 | at 7½ pr ct. | 38,68 |
| Cost of silks, &c. | fs 1200,00 | " | $225,00 | | |
| | | 10 per ct. | 22,50 | | |
| | | | 247,50 | at 15 pr ct. | 37,12½ |
| Cost of flowers, &c. | fs. 600,30 | " | $112,55 | | |
| | | 10 per ct. | 11,25 | | |
| | | | $123,80 | at 30 pr ct. | 37,14 |
| | | | | Amount of Duties | $112,94½ |

7. What is the duty on 10 cases of silk, invoiced at Sa. Rs. 5610 14 2, Rs. at 50 cts. each, and duty at 15 per ct.? Ans. $504,98.

8. What is the duty on 100 bags salt petre, cost Sa. Rs. 2015 12 5, at 7½ per cent.? Ans. $90,71.

9. Required the duty on 3 camel's hair shawls, cost Sa. Rs. 1050, at 25 per cent.? Ans. $157,50.

10. Required the duty on 15 cases of paper from Leghorn, cost Pezzas 926 18 10, the pezza at 90 cents, and duty 30 per cent.? Ans. $275,30.

| *Bonds.* | *Debentures.* |
|---|---|
| $91,30 | $89,42 |
| 92,00 | 89,00 |
| 92,00 | 90,00 |
| $275,30 Duty. | $268,42 Drawback. |

11. Three cases of goods of the following amount were imported from Liverpool, on the 1st of January, viz.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3. | One case bombasin, cost ster. | £63 | 8 | 7 | duty 15 | per ct. | |
| 10. | " " calicoes, cost | 54 | 7 | 6 | " 25 | " | |
| 7. | " " metal buttons, cost | 40 | 8 | 4 | " 20 | " | |

Required the amount of duties and drawback valuing the £ ster. at $4,44.

Ans. $152,34 for Duty.

$152,34 less 2½ per cent.* 148,53 for Debentures.

* Allowed by law to be retained, but no drawback is allowed on duties of a less sum than $50.

| *Bonds.* | | | *Debentures.* | | |
|---|---|---|---|---|---|
| 1 Bond due | 1st Sept. | $50,34 | 1 payable | 2d Sept. | $49,53 |
| 1 " | 1st Nov. | 51,00 | 1 " | 2d Nov. | 49,00 |
| 1 " | 1st Jan. | 51,00 | 1 " | 2d Jan. | 50,00 |
| | | $152,34 | | | $148,53 |

*TABLES of the value of the Gold Coins of Great Britain, France, and Spain, according to the Act of Congress of April 29, 1816.*

| Great Britain & Portugal. | | | | | Gold Coins of France. | | | | | Gold Coins of Spain. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *grs.* | *cts.* | *dwt.* | $ | *cts.* | *grs.* | *cts.* | *dwt.* | $ | *cts.* | *grs.* | *cts.* | *dwt.* | $ | *cts.* |
| 1 | 4 | 1 | 0 | 89 | 1 | 4 | 1 | 0 | 87 | 1 | 3 | 1 | 0 | 84 |
| 2 | 7 | 2 | 1 | 78 | 2 | 7 | 2 | 1 | 75 | 2 | 7 | 2 | 1 | 68 |
| 3 | 11 | 3 | 2 | 67 | 3 | 11 | 3 | 2 | 62 | 3 | 11 | 3 | 2 | 52 |
| 4 | 15 | 4 | 3 | 55 | 4 | 15 | 4 | 3 | 49 | 4 | 14 | 4 | 3 | 36 |
| 5 | 19 | 5 | 4 | 44 | 5 | 18 | 5 | 4 | 36 | 5 | 17 | 5 | 4 | 20 |
| 6 | 22 | 6 | 5 | 33 | 6 | 22 | 6 | 5 | 23 | 6 | 21 | 6 | 5 | 04 |
| 7 | 26 | 7 | 6 | 22 | 7 | 25 | 7 | 6 | 11 | 7 | 25 | 7 | 5 | 88 |
| 8 | 30 | 8 | 7 | 11 | 8 | 29 | 8 | 6 | 98 | 8 | 28 | 8 | 6 | 72 |
| 9 | 33 | 9 | 8 | 00 | 9 | 33 | 9 | 7 | 85 | 9 | 31 | 9 | 7 | 56 |
| 10 | 37 | 10 | 8 | 89 | 10 | 36 | 10 | 8 | 73 | 10 | 35 | 10 | 8 | 40 |
| 11 | 41 | 11 | 9 | 78 | 11 | 40 | 11 | 9 | 60 | 11 | 39 | 11 | 9 | 24 |
| 12 | 44 | 12 | 10 | 67 | 12 | 44 | 12 | 10 | 47 | 12 | 42 | 12 | 10 | 08 |
| 13 | 48 | 13 | 11 | 55 | 13 | 47 | 13 | 11 | 34 | 13 | 45 | 13 | 10 | 92 |
| 14 | 52 | 14 | 12 | 44 | 14 | 51 | 14 | 12 | 21 | 14 | 49 | 14 | 11 | 76 |
| 15 | 56 | 15 | 13 | 33 | 15 | 55 | 15 | 13 | 09 | 15 | 53 | 15 | 12 | 60 |
| 16 | 59 | 16 | 14 | 22 | 16 | 58 | 16 | 13 | 96 | 16 | 56 | 16 | 13 | 44 |
| 17 | 63 | 17 | 15 | 11 | 17 | 62 | 17 | 14 | 83 | 17 | 59 | 17 | 14 | 28 |
| 18 | 67 | 18 | 16 | 00 | 18 | 65 | 18 | 15 | 71 | 18 | 63 | 18 | 15 | 12 |
| 19 | 70 | 19 | 16 | 89 | 19 | 69 | 19 | 16 | 58 | 19 | 67 | 19 | 15 | 96 |
| 21 | 74 | 20 | 17 | 78 | 20 | 73 | 20 | 17 | 45 | 20 | 70 | 20 | 16 | 80 |
| 22 | 78 | | | | 21 | 76 | | | | 21 | 73 | | | |
| 23 | 85 | | | | 22 | 80 | | | | 22 | 77 | | | |
| | | | | | 23 | 83 | | | | 23 | 81 | | | |

A

# NEW SYSTEM

OF

# PRACTICAL BOOK-KEEPING:

IN WHICH

THE VARIOUS METHODS OF THAT USEFUL ART

ARE CONCISELY EXPLAINED.

BY MICHAEL WALSH.

When a youth has acquired a readiness in writing and arithmetic, he may learn the beautiful and useful art of Book-Keeping, according to the Italian method. - - -

Every body must allow that nothing is likelier to keep a man within compass, than having constantly before his eyes the state of his business.

*Locke on Education.*

BOSTON:

CHARLES J. HENDEE.

1836.

*DISTRICT OF MASSACHUSETTS—to wit:*

DISTRICT CLERK'S OFFICE.

BE IT REMEMBERED, That on the twenty-seventh day of September, A. D. 1826, in the fifty-first year of the Independence of the United States of America, MICHAEL WALSH, of the said District, has deposited in this Office the Title of a Book, the Right whereof he claims as Author, in the words following, to wit:

"A NEW SYSTEM OF PRACTICAL BOOK-KEEPING: In which the various methods of that useful Art are concisely explained.

BY MICHAEL WALSH.

*"When a youth has acquired a readiness in writing and numbers, he may learn the useful and beautiful art of Book-Keeping, according to the Italian method.———*

*"Every body must allow that nothing is likelier to keep a man within compass, than having constantly before his eyes the state of his business.*

LOCKE ON EDUCATION."

In conformity to the Act of Congress of the United States, entitled, "An Act for the Encouragement of Learning, by securing the Copies of Maps, Charts, and Books, to the Authors and Proprietors of such Copies, during the times therein mentioned;" and also to an Act, entitled, "An Act supplementary to an Act, entitled, An Act for the Encouragement of Learning, by securing the Copies of Maps, Charts, and Books, to the Authors and Proprietors of such Copies, during the times therein mentioned; and extending the benefits thereof to the Arts of Designing, Engraving, and Etching Historical and other Prints."

JOHN W. DAVIS,
*Clerk of the District of Massachusetts.*

# BOOK-KEEPING.

BOOK-KEEPING is the art of recording the transactions of trade in a regular manner.

Books may be kept by Single or Double Entry.

Single Entry is used in retail business.

Double Entry is used in wholesale and mercantile affairs.

In order to this, three books are required, viz. the Waste-Book, Journal and Leger, and others, called auxiliary books are necessary in extensive business.

The Waste Book contains the original entry of every transaction, the time and circumstances of which should be stated in a clear and regular manner.

In teaching, a narrative of the business is given in the Waste Book, and transferred into the Journal; but in actual business, the Journal entries are collected from subsidary books, the titles of which are indicative of their uses, as Invoice Book, Sales Book, Charges, &c. In Kelly's system, there is a regular history of the business (thus collected) in the Waste Book to his third set, and this gives to that work a decided preference to any other British publication on the subject. It would be well, if, in every business, wherein arrangement is requisite, a plain, connected narrative of the daily transactions was kept, referring to subsidary books, or proper vouchers, if necessary. *We should then seldom hear* of that difficulty in adjusting the accounts of traders, shipmasters, and others, which leads to disagreement between parties, and often to tedious and expensive litigation. Nor can the arbitration of friends, or Courts of Justice effect a *satisfactory* settlement, without the requisite items or vouchers.

The Journal is an abstract of the Waste Book with a formal statement of Debtor and Creditor in order to transfer the several cases with more ease to the Leger.

The Leger is a register of all the transactions of the business, disposed in such order, that those belonging to every different subject, are brought together in one place, which is called the separate folio allotted to it.

In the Leger, every account is to be kept in Debtor and Creditor, and has allotted to it an equal portion of the left and right pages of one folio or opening. The left serving for the Debtor, and the right for the Creditor.

On the debit side, the Title is written with the letters *Dr.* after it, and on the oppite side the word *Contra* is written, and *Cr.* after it.

Besides the columns for money, there is also a column near them, in which is written the number of the folio, where the account stands, which corresponds with that you are posting; and near the margin is the column for the date; and when the business is extensive, there is also a column near it, for the page of the Journal, whence each account is taken.

There is also belonging to the Leger, an alphabet, to serve as an Index: which in teaching, is commonly placed at the beginning of it, but in business it makes a separate book. In this are inserted the names of all accounts that are opened in the Leger, each placed under the letter which is its initial, and its page in the Leger against it. The Personal accounts are distinguished by the initial of the Surname of the party. Accounts of Partnership by that of the Firm, and the other accounts by their name or kind.

## *RULES FOR JOURNALIZING.*

Whatever you receive - - - -
Whatever is to be charged with any cost or expense
Whoever is to be charged with any debt, cost, expense, or acceptance - - - - } is Dr. *

Whatever is delivered by you, or ceases to be yours
On whatsoever account any thing is received,
On whosoever's account any thing is received,
Whosoever pays for himself, or is discharged,
Whoever pays for you, or is accountable in your stead, - - - - - - - - } is Cr. *

Notes given, are termed - Notes Payable.
Notes received, " - - Notes Receivable.
Bills of Exchange directly or indirectly in the Merchant's favour, are termed, - - Bills Receivable.
Bills, when accepted by him, - Bills Payable.

In cases where personal or real Drs. or Crs. are wanting, the deficiency is to be supplied by fictitious names.

The word *To* is the sign or mark of a Credit in a Journal entry, and if not expressed, is always understood, and to be supplied in posting.—When the same account is Dr. or Cr. alone in two or more transactions on the same day, it will save writing, and be equally plain, if they be put in one entry in the Journal. The method of abridging, even for a whole month is adopted by some of the best accountants, and this, with that of comprising the several kinds of goods under the title of *Merchandize*, includes all that may be termed *Modern Improvement* on the Italian method.—In cases where there are sundry Drs. and Crs. in one transaction, it is better for the learner to resolve or put them into two entries, that shall have but one of their terms complex.

* For the amount.

## EXAMPLES FOR JOURNALIZING.

| | WASTE BOOK. | | JOURNAL. | | |
|---|---|---|---|---|---|
| 1. | Bought Flour for Cash - - - - | Flour | Dr. | to | Cash. |
| 2. | Sold Flour for Cash - - - - | Cash | " | " | Flour. |
| 3. | Bought Iron for Flour - - - - | Iron | " | " | Flour. |
| 4. | Sold Iron for Salt - - - - | Salt | " | " | Iron. |
| 5. | Sold Salt for Wine - - - - | Wine | " | " | Salt. |
| 6. | Bought Coffee for Wine - - - - | Coffee | " | " | Wine. |
| 7. | Sold Wine to A. on credit - - - | A. | " | " | Wine. |
| 8. | Received Cash from A. in full - - | Cash | " | " | A. |
| 9. | Sold Wine to B. on his note - - | Notes Receivable | " | " | Wine. |
| 10. | Received payment of B's note in Cash - | Cash | " | " | Notes Receivable. |
| 11. | Bought Flour from D. on my note - - | Flour | " | " | Notes Payable. |
| 12. | Paid B. in Cash for my note - - | Notes Payable | " | " | Cash. |
| 13. | Lost a bank note of $5 - - - | Profit and Loss | " | " | Cash. |
| 14. | Received a wager of $5 - - - | Cash | " | " | Profit and Loss. |
| 15. | Paid for a year's interest on my note to G. $2 | Profit and Loss | " | " | Cash. |
| 16. | Received for a year's interest on C's note $2 | Cash | " | " | Profit and Loss. |

| | | |
|---|---|---|
| 17 | Bought of B. 20 barrels of Flour at $5,50<br>Paid in Cash, $55,00<br>Gave my note on demand for $55,00 | Flour Dr. to Sundries.<br>For cost of 20 bbls. at $5,50 $110,00<br>To Cash 55,00<br>To Notes Payable 55,00 |
| 18 | Sold G. 20 barrels of Flour, at $6,25.<br>Received in Cash $45,00<br>8 bbls. of Oil, at $10 80,00 | Sundries Drs. to Flour.<br>Rec'd for 20 barrels, at $6,25 $125,00<br>Cash 45,00<br>Oil, for 8 bbls. at $10 80,00 |
| 19 | Paid freight of 20 hhds. of Molasses received per Volant on consignment from J. J. $18,00 | J. S's Sales Dr. to Cash.<br>Paid for freight $18,00 |
| 20 | Received payment of a legacy $100,00 | Cash Dr. to Stock.<br>Received a legacy $100,00 |
| 21 | Received from B. as apprentice fee with his son $100,00 | Cash Dr. to Profit and Loss.<br>Received an apprentice fee, $100,00 |
| 22 | Accepted Capt. G's bill in favour of H. at 5 days for repairs on Schooner Jane at N. Orleans, for $100,00 | Schooner Jane Dr. to Bills Payable.<br>For acceptance of Capt. G's bill, $100,00 |
| 23 | Shipped in the Louisiana for New Orleans, consigned to H. on my account, viz.<br>9 barrels of Beef, at $9,00 $81,00<br>20 qtls. Fish at 2,00 40,00<br>Paid Charges 3,00<br>$124,00 | Adventure per Louisiana Dr. to Sundries.<br>To Beef, 9 bbls. at $9 81,00<br>To Fish, 20 qtls. at $2 40,00<br>To Cash, paid charges 3,00<br>$124,00 |

| | | |
|---|---|---|
| 24 | Received from H. of New-Orleans an account Sales of my adventure per Louisiana. Net proceeds are $142,50 | H. of New-Orleans Dr. to Adv. per Louisiana. For net proceeds $142,50 |
| 25 | Paid Capt. G's bill accepted 5th inst. for $100,00 | Bills Payable Dr. to Cash. Paid for Capt. G's Bill $100 |
| 26 | Sold N. on his note at 90 days J. J's 20 hhds. Molasses, 1646 galls. at 30 cts. $493,80 | Notes Receivable Dr. to J. J's Sales. Received N's note for 1646 gallons at 30 cts. $493,80 |
| 27 | Paid my subscription to the sufferers by fire at A. $20 | Stock Dr. to Cash. Paid for sufferers at A. $20 |
| 28 | Paid my subscription to the Reading Room $5 | Profit and Loss Dr. to Cash. Paid for Reading Room, $5 |
| 29 | I have taken up my note of 15th ult. to B. on which he has allowed for discount, $2<br>Paid balance in cash, 98<br>$100 | Notes Payable Dr. to Sundries.<br>To Profit and Loss, Interest, or Discount for $2<br>To Cash paid the balance 98<br>$100 |
| 30 | On offering N's note for discount, by desire of J. J. I have received in Cash, $486,40<br>Discount allowed on it 7,40 | Sundries Drs. to Notes Receivable.<br>For Payment of N's note, viz.<br>Cash $486,40<br>J. J's Sales for discount 7,40<br>$493,80<br>or J. J's account. If the sales account was closed. |

| | | |
|---|---|---|
| 31 | My note of $564 at 60 days, having been offered for discount at the B. B. Bank, I have received in Cash $558,08<br>Allowed for 60 days discount 5,92 | Sundries Drs. to Notes payable.<br>Cash $558,08<br>Profit and loss for discount 5,92<br>$564,00 |
| 32 | Paid J. J. for net proceeds his consignment per Volant, viz.<br>Freight already charged, $18,00<br>Wharfage, Storage, advertising, &c. 7,75<br>Discount allowed to N. 7,40<br>Commission on $493,80 at 5 per ct. 24,69<br>Cash paid J. J. per receipt. 435,96 | J. J's Sales Dr. to Sundries.<br>For closing the account.<br>To Charges on Merchandize $7,75<br>To Commission on $493,80 at 5 per ct. 24,69<br>To Cash paid J. J. per receipt 435,96<br>$468,40<br>Or Credit J. J's account for the net proceeds, and charge him with the payment. |

## *RULES FOR POSTING.*

The first thing to be done in posting, or transferring accounts, is to title the Leger, that is, to open an account for each of the Drs. and Crs. contained in the Journal entry, taking care not to make two titles alike, as an account is never opened twice, though it may be transferred for want of room; and, to prevent such repetition, (as well as for readily finding any account,) the title should be immediately marked in the alphabet.

Secondly. As all the entries in the Journal are double, you must be careful on making any person or thing Dr., immediately to write on the Cr. side of the person or thing referred to. In other words, when you write on the left side of an account, (as you always do in making the first charge,) you must immediately write on the contrary or right of another account, for the same amount, if there be but one Dr. and one Cr.; but if there be Sundries, you are to write on each for its respective amount.

In the following four cases, which include all the variety that occurs in posting, the letters over the several Drs. and Crs. in the Journal entries, refer to the corresponding entry or place in the Leger.

*Jan'y.* 1.

[a]James Barton Dr. to Flour.[b]

For 30 barrels $6 per barrel.

**Dr. James Barton.* Cr.**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [a]Jan. | 1 | To Flour,† for bs. $ 30, 6 | | 180 | | | | | | | |

* When the Dr. and Cr. are on the same page, the word *Contra* is not used.

† In making a charge of goods by *Double Entry*, the name or kind is mentioned immediately after the word *To*, then the quantity, price, &c. But in Single Entry, the *quantity* is mentioned after *To*, then the kind, price, &c. of the article.

**Dr. Flour. Cr.**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | [b]Jan. | 1 | By James Barton bls. 30, 6 | | 180 |

*Jan'y. 2.*

[a]**William Anson Dr. to Sundries**

[b]To Beef for 3 bbls. at $9,59, $28,50
[c]To Fish for 9 quintals, at $2,50, 22,50
51,00

**Dr. William Anson. Cr.**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| [a]Jan. | 2 | To Sundries | | 51 | 00 | | | |

**Dr. Beef. Cr.**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | [b]Jan. | 2 | By William Anson, bls. 3, $9,50 | 28 | 50 |

**Dr. Fish. Cr.**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | [c]Jan. | 2 | By William Anson, bls. 9, $22,50 | 22 | 50 |

*Jan'y.* 3.

**Sundries. Drs. to [c]James Smith.**

| | | |
|---|---|---|
| [a]Oil for 3 bbls. Sperm. $9,50. | $28,50 | |
| Cash | 56,50 | |
| | | 85,00 |

**Dr. Oil. Cr.**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [a]Jan. | 3 | To James Smith, 3 bbs. $9,50 | | | 28 | 50 | | | | | | | | | | | |

**Dr. Cash. Cr.**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [b]Jan. | 3 | To Jas. Smith | | | 56 | 50 | | | | | | | | | | | |

**Dr. James Smith. Cr.**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | [c]Jan. | 3 | By Sundries. | | | | | | 85 | 00 | |

*Jan'y.* 4.

**Sundries Drs. to Sundries.**

| | | |
|---|---|---|
| [a]Iron for 10 cwt. at $6,00 | $60,00 | |
| [b]Mackerel, 14 bbls. at $5,00 | 70,00 | |
| | | $130,00 |
| [c]To Coffee, for 252 lb. at 25 cts. | $63,00 | |
| [d]To Notes Payable for mine to James Long | 67,00 | |

**Dr. Iron. Cr.**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a Jan. | 4 | To Sundries, | | | | | | | | | | | |
| | | cwt. | | | | | | | | | | | |
| | | 10, $6 | | | 60 | 00 | | | | | | | |

**Dr. Mackerel. Cr.**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| b Jan. | | To Sundries, | | | | | | | | | | | |
| | | bbls. | | | | | | | | | | | |
| | | 14, $5,00 | | | 70 | 00 | | | | | | | |

**Dr. Coffee. Cr.**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | c Jan. | 4 | By Sundries, | | | | |
| | | | | | | | | | lb. | cts. | | | |
| | | | | | | | | | 252, at | 25 | | 63 | 00 |

**Dr. Notes Payable. Cr.**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | d Jan. | 4 | By Sundries | | | | |
| | | | | | | | | | to Jas. Long | | | 67 | 00 |

In business, the complex entry of *Sundries* Drs, to *Sundries* is studiously avoided by accountants. It is introduced in this place merely to show the learner how such entries may be posted.

As precision is one of the leading features of Book-Keeping, and the room in a Leger being always precious, it is of much consequence to confine every posting to a single line.

The book keeper, for his own convenience when he is posting, commonly marks all the accounts throughout a page of the Journal, with their different places in the Leger ; and as he posts each account, he makes a point with his pen in

the Journal column : By this method he is less liable to Error, and makes more despatch, than if he had to examine the alphabet for each as he wants to post it.

In arranging the accounts in the Leger the same order is observed as in the Journal, except where accounts of a particular class, which are often referred to at the same time, are contiguously placed, to save the trouble of frequently turning to the Index. This method of classing accounts of the same description is found very convenient in business, but in the theory of Book-keeping it is more obvious and regular to follow the order of the Journal.

## TO MAKE A TRIAL BALANCE.

When every account is posted from the Journal into the Leger, and as they will be on opposite or contrary sides, it is evident that the sums of the Dr. side will equal that of the Cr. side. This Trial or Check is generally made on a separate paper, and it may be performed every day, week, month or year, according to the extent of the business. The Titles of the Leger accounts are written under each other, with Dr. to the left, and Cr. to the right. Annexed to each, on its proper side, is set down the sum of every Dr. and Cr. and both sides will agree if the work be right, as in the following example from the cases on posting.

| Drs. | | | Crs. | |
|---|---|---|---|---|
| $ | cts. | | $ | cts. |
| 165 | | James Barton. | | |
| | | Flour - - - | 165 | |
| 51 | | William Anson | | |
| | | Beef - - - | 28 | 50 |
| | | Fish - - - | 22 | 50 |
| 56 | 50 | Cash - - - | | |
| 28 | 50 | Oil - - - - | | |
| | | James Smith. | 85 | |
| 60 | | Iron - - - - | | |
| 70 | | Mackerel - - | | |
| | | Coffee - - - | 63 | |
| | | Notes Payable | 67 | |
| 431 | 00 | | 431 | 00 |

## TO BALANCE THE LEGER.

When every transaction is entered into the Leger, and the work proved by a Trial Balance, the next thing is, to balance the Leger; that is, to make each account even through the whole book, in order to know the true state of your affairs. For this purpose, a new account is to be opened at the end by the Title of Balance. To the debit of this account will be brought all the money, goods, and other property belonging to you, and also the debts due to you, and on the credit will appear the debts you owe. Thus you have at one view the net of your estate; and the Profit and Loss Account, to which you bring all your commissions, gains, losses, expenses, &c. will show in like manner, your success in trade, since you began the present set of books; and by these two all the other accounts are balanced or made even.

In making the general balance, merchants seldom open a balance account in the Leger, but use a balance sheet, which is transcribed at the end of the Journal.

## PARTNERSHIP ACCOUNTS.

It is thought that these are reducible to the same simple form, and are to be balanced in the same manner, as other individual accounts. Those who wish to attend more particularly to this part of Book-keeping, may consult Jackson's System, in which the Theory of Accounts is carried to great extent.

On partnership accounts, Mr. Booth, a merchant, formerly of New-York, whose system is acknowledged in Great Britain to be the first English work, illustrative of the modern Italian method, thus remarks: "After a long and intimate acquaintance with the subject, after investigating partnership accounts under every form, and viewing them in every light, in which folly and ignorance could well have placed them, I never saw any difficulty in stating the joint concerns of a company, but what originated in the mistaken notion of the parties themselves. If merchants will not be careful to proceed in a regular line at first setting out, and keep a plain, simple narrative of their daily transactions, it can be no wonder that they so frequently get bewildered."

## WASTE-BOOK.

### *Boston, January 1st, 1826.*

| | | | |
|---|---|---|---|
| * √ | An Inventory of Money, Goods, and Debts, belonging to me A. B. and also what I owe. | | |
| | I have in ready money, - - | $300,00 | |
| | 60 barrels of Flour, at $5,50 - - | 330,00 | |
| | 50 quintals of Fish, at $2,00 - - | 100,00 | |
| | James Lamos's note due on demand - | 40,00 | |
| | Charles Hampden, of Northampton, owes on account - - - - - - | 25,00 | |
| | | | 795 00 |
| | ——— ,, ——— | | |
| √ | I owe as follows. | | |
| | To Simon Hill, on my note on demand | $30,00 | |
| | To Reu. Bradley of Worcester, on account | 20,00 | |
| | | | 50 00 |
| | ——— 2 ——— | | |
| √ | Bought of Amos Grove 40 barrels of Mackerel, at $4,50, and paid him, viz. | | |
| | 20 barrels of Flour, at $6 - - | $120,00 | |
| | Balance in Cash - - - - | 60,00 | |
| | | | 180 00 |
| | ——— 3 ——— | | |
| √ | Sold William Richards 20 barrels of Flour at $6 | | |
| | Received in Cash - - - - | $50,00 | |
| | His note on demand for - - | 70,00 | |
| | | | 120 00 |
| | ——— 4 ——— | | |
| √ | Paid Reuben Bradley in full - - - | | 20 00 |
| | ——— 5 ——— | | |
| √ | Taken up my note to Simon Hill paying him, viz. | | |
| | 4 barrels of Flour, at $6 - - - | $24 | |
| | Balance in Cash - - - - - | 6 | |
| | | | 30 00 |

* This mark shows that the account has been Journalized.

## *Boston, January 6th,* 1826.

| | | |
|---|---|---|
| √ | Received from Charles Hampden, on account | 15 00 |
| | 8 | |
| √ | Shipped in the Ruby, Simon Gale, for Albany, and consigned to Amos Gilman, on my account, viz. | |
| | 20 quintals Fish, at $2,50 - - - $50 | |
| | 10 barrels No. 1 Mackerel, 5,50 - - 55 | |
| | Paid Charges at shipping - - - 5 | |
| | | 100 00 |
| | 9 | |
| √ | James Lamos having failed and compounded with his creditors, paying 50 per cent. I have given up his note and received - - - | 20 00 |
| | 10 | |
| √ | Sold Charles Dutton, on his note at 30 days, 10 barrels Flour at $6,50 - - - | 65 00 |
| | 20 | |
| √ | Received from Amos Gilman, of Albany, an Account sales of my Adventure per the Ruby, the net proceeds being - - - - - | 130 00 |
| | ,, | |
| √ | Received from James Rice for my bill of $100 in his favor on Amos Gilman of Albany, at 5 days sight, on which I discounted 1 per cent. viz. | |
| | In Cash - - - - - - $99 | |
| | Discount on $100 at 1 per cent. - - 1 | |
| | | 100 00 |
| | 23 | |
| √ | Bought of Charles Dutton, of Plymouth, one half of his schooner Caroline, paying him, viz. | |
| | Gave up his note for - - - $65 | |
| | Gave my note for 90 days, for - - 300 | |
| | Gave balance in Cash - - - 85 | |
| | | 450 00 |

*Boston, January 24th, 1826*

| | | | |
|---|---|---|---|
| √ | Received for relinquishing my purchase of Flour at Auction - - - - - - - - | 50 | 00 |
| | 25 | | |
| √ | Received a legacy of - - - - - | 50 | 00 |
| | 26 | | |
| √ | Paid my subscription to the B. H. Monument | 5 | 00 |
| | " | | |
| √ | Paid my subscription to the Reading Room - | 5 | 00 |
| | 27 | | |
| √ | Sold Cyrus Bates of Concord 10 barrels of Mackerel at $5,50, to be paid in 30 days - | 55 | 00 |
| | 28 | | |
| √ | Paid for repairs on schooner Caroline, per bills<br>Charles Dutton's part is - - - $30<br>My part - - - - - - - 30 | 60 | 00 |
| | 30 | | |
| √ | Paid for rent, taxes, &c. - - - | 20 | 00 |

## *Boston, January 1st, 1826.*

| | | | | |
|---|---|---|---|---|
| 1 | | **Sundries Drs. to Stock.** | | |
| 1 | | Cash - - - - - - - | $300 | |
| 1 | | Flour, for 60 barrels at $5,50 - | 330 | |
| 2 | | Fish, for 50 qtls. at $2,00 - - | 100 | |
| 2 | | Notes Receivable for James Lamos's on demand - - - - - - | 40 | |
| 2 | | Charles Hampden, due on account - | 25 | |
| | | | | 795 00 |
| | | " | | |
| 1 | | Stock Dr. to Sundries. | | |
| | 2 | To Notes payable for mine to Simon Hill on demand - - - - - - | $30 | |
| | 2 | To Reuben Bradley of Worcester - | 20 | |
| | | | | 50 00 |
| | | 2 | | |
| 3 | | Mackerel, Dr. to Sundries. | | |
| | | For cost of 40 bbls. at $4,50. | | |
| | 1 | To Flour, for 20 bbls. at $6 - - | $120 | |
| | 1 | To Cash - - - - - - | 60 | |
| | | | | 180 00 |
| | | 3 | | |
| 1 | | Sundries Drs. to Flour. | | |
| | | For Sales of 20 bbls. at $6. | | |
| 1 | | Cash - - - - - - - | $50 | |
| 2 | | Notes Receivable for William Richards's | 70 | |
| | | | | 120 00 |
| | | 4 | | |
| 1 | 2 | Reuben Bradley Dr. to Cash. | | |
| | | Paid him in full. - - - - - - | | 20 00 |
| | | 5 | | |
| 2 | | Notes Payable Dr. to Sundries. | | |
| | | For payment of mine to Simon Hill. | | |
| | 1 | To Flour, for 4 bbls. at $6 - - | $24 | |
| | 1 | To Cash - - - - - | 6 | |
| | | | | 30 00 |

## *Boston, January 6th,* 1826.

| | | | | |
|---|---|---|---|---|
| 1 | 2 | Cash Dr. to Charles Hampden, rec'd on acc't. | | 150 00 |
| | | 8 | | |
| 3 | | Adventure to Albany Dr. to Sundries. | | |
| | | For amount per the Ruby. | | |
| | 2 | To Fish, 20 qtls. at $2,50 - - | $50 | |
| | 3 | To Mackerel, 10 bbls. No. 1, $5,50 - | 55 | |
| | 1 | To Cash, paid charges - - - | 5 | |
| | | | | 110 00 |
| | | 9 | | |
| | 2 | Sundries Drs. to Notes Receivable. | | |
| | | For adjustment of James Lamos's. | | |
| 1 | | Cash - - - - - - - | $20 | |
| 4 | | Profit and Loss, abated - - - | 20 | |
| | | | | 40 00 |
| | | 10 | | |
| 2 | 1 | Notes Receivable Dr. to Flour. | | |
| | | Received Charles Dutton's at 30 days for 10 bbls. at $6,50 - - - - - | | 65 00 |
| | | 20 | | |
| 3 | 3 | Amos Gilman Dr. to Adventure to Albany. | | |
| | | For net proceeds of consignment per the Ruby | | 130 00 |
| | | " | | |
| 3 | 3 | Bills Receivable Dr. to Amos Gilman. | | |
| | | For my draft on him in favour of James Rice. | | 100 00 |
| | | " | | |
| | 3 | Sundries Drs. to Bills Receivable. | | |
| | | For payment of my bill on Amos Gilman. | | |
| 1 | | Cash - - - - - - - | $99 | |
| 4 | | Profit and Loss, for discount at 1 per cent. | 1 | |
| | | | | 100 00 |
| | | 23 | | |
| 3 | | Schooner Caroline, my half, Dr. to Sundries. | | |
| | 2 | To notes Receivable given up to Charles Dutton's - - - - - - - | $65 | |
| | 2 | To notes payable for mine to him, - | 300 | |
| | 1 | To Cash - - - - - - - | 85 | |
| | | | | 450 00 |

*Boston, January 24th, 1826.*

| | | | |
|---|---|---|---|
| 1 | 4 | Cash Dr. to Profit and Loss. | |
| | | Received for my purchase of Flour at Auction. | 50 00 |
| | | 25 | |
| 1 | 1 | Cash Dr. to Stock. | |
| | | Received a legacy - - - - | 50 00 |
| | | 26 | |
| 1 | 1 | Stock Dr. to Cash. | |
| | | Paid my subscription to the B. H. Monument | 5 00 |
| | | ,, | |
| 4 | 1 | Profit and Loss Dr. to Cash. | |
| | | Paid at the Reading Room - - - | 5 00 |
| | | 27 | |
| 4 | 3 | Cyrus Bates Dr. to Mackerel. | |
| | | For 10 bbls. at $5,50 - - - - | 55 00 |
| | | 28 | |
| | 1 | Sundries Drs. to Cash. | |
| | | For payment of bills on the Caroline, viz. | |
| | 3 | Schooner Caroline, my half, for - $30 | |
| | 4 | Charles Dutton, for his part - - 30 | |
| | | | 60 00 |
| | | 30 | |
| 4 | 1 | Profit and Loss Dr. to Cash. | |
| | | Paid for Rent, Taxes, &c. - - - | 20 00 |

*The following Entries will be of use in making the general Balance and closing the Leger.*

## *Boston, January* 31*st*, 1826.

| | | | | |
|---|---|---|---|---|
| 4 | | Sundries Drs. to Profit and Loss. | | |
| | | For gain on the following Accounts. | | |
| 1 | | Flour - - - - - - - | $32 | |
| 2 | | Fish - - - - - - - | 10 | |
| 3 | | Mackerel - - - - - - - | 20 | |
| 3 | | Adventure to Albany - - - - | 20 | |
| | | | | 82 00 |
| | | „ | | |
| 1 | | | | |
| 4 | | Profit and Loss Dr. to Stock. | | |
| | | For net gain - - - - - | | 86 00 |
| | | „ | | |
| 4 | | Balance Dr. to Sundries. | | |
| | 1 | To Cash remaining - - - | $318 | |
| | 1 | To Flour, 6 bbls. at $5,50 - - | 33 | |
| | 2 | To Fish, 30 qtls. at $2 - - - | 60 | |
| | 2 | To Notes Receivable, William Richards's | 70 | |
| | 2 | To Charles Hampden - - - | 10 | |
| | 3 | To Mackerel, 20 bbls. at $4,50 - | 90 | |
| | 3 | To Amos Gilman - - - | 30 | |
| | 3 | To Schooner Caroline - - - | 480 | |
| | 4 | To Cyrus Bates - - - - | 55 | |
| | 4 | To Charles Dutton - - - - | 30 | |
| | | | | 1176 00 |
| | | „ | | |
| 2 | 4 | Notes payable Dr. to Balance. | | |
| | | For amount of mine to Charles Dutton | | 300 00 |
| | | „ | | |
| 4 | 4 | Stock Dr. to Balance. | | |
| | | For net Stock - - - - - | | 876 00 |

# ALPHABETICAL INDEX TO THE LEGER


A

enture to Albany 3

B

lley Reuben - 2
s Receivable - 3
es Cyrus - - 4
ance - - - 4

C

h - - - 1

D

ton Charles - 4

F

ur - - - 1
n - - - 2

G

Gilman Amos - - 3

H

Hampden Charles - 2

M

Mackerel - - 3

N

Notes Receivable - 2
Notes Payable - 2

P

Profit and Loss - 4

S

Schooner Caroline - 3
Stock - - - 1

**Stock** — Dr.

| 1826 | | Cr. | | |
|---|---|---|---|---|
| Jan. 1 | To Sundries - - - - - | | 50 | 00 |
| 26 | To Cash - - - - - | 1 | 5 | 00 |
| 31 | To Balance, for net stock - - | 4 | 876 | 00 |
| | | | 931 | 00 |

**Cash** — Dr.

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 1 | To Stock - - - - - | 1 | 300 | 00 |
| 3 | To Flour - - - - - | 1 | 50 | 00 |
| 6 | To Charles Hampden - - | 2 | 15 | 00 |
| 9 | To Notes Receivable - - | 2 | 20 | 00 |
| 20 | To Bills Receivable - - | 3 | 99 | 00 |
| 24 | To Profit and Loss - - - | 4 | 50 | 00 |
| 25 | To Stock - - - - - | 1 | 50 | 00 |
| | | | 584 | 00 |

**Flour** — Dr.

| 1826 | | bbls. | | | |
|---|---|---|---|---|---|
| Jan. 1 | To Stock at $5,50 per bbl. - | 60 | 1 | 330 | 00 |
| 31 | To Profit and Loss, gained - | | 4 | 32 | 00 |
| | | 60 | | 362 | 00 |

## Contra Cr.

| 1826 | | Dr. | | |
|---|---|---|---|---|
| Jan. 1 | By Sundries - - - - | | 796 | 00 |
| 25 | By Cash - - - - - | 1 | 50 | 00 |
| 31 | By Profit and Loss, for net gain* | 4 | 86 | 00 |
| | | | 931 | 00 |

## Contra Cr.

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 2 | By Mackerel - - - - | 3 | 60 | 00 |
| 4 | By Reuben Bradley - - - | 2 | 20 | 00 |
| 5 | By Notes Payable - - - | 2 | 6 | 00 |
| 8 | By Adventure to Albany - - | 3 | 5 | 00 |
| 23 | By Schooner Caroline - - | 3 | 85 | 00 |
| 26 | By Stock - - - - - | 1 | 5 | 00 |
| " | By Profit and Loss - - - | 4 | 5 | 00 |
| 28 | By Sundries - - - - | | 60 | 00 |
| 30 | By Profit and Loss - - - | 4 | 20 | 00 |
| 31 | By Balance Remaining - - | 4 | 318 | 00 |
| | | | 584 | 00 |

## Contra Cr.

| 1826 | | bbls. | | | |
|---|---|---|---|---|---|
| Jan. 2 | By Mackerel at $6 - - | 20 | 3 | 120 | 00 |
| 3 | By Sundries 6 - - | 20 | | 120 | 00 |
| 5 | By Notes Payable 6 - - | 4 | 2 | 24 | 00 |
| 10 | By Notes Receivable 6,50 - | 10 | 2 | 65 | 00 |
| 31 | By Balance 5,50 - | 6 | 4 | 33 | 00 |
| | | 60 | | 362 | 00 |

* If the legacy and B. H. M. subscription were carried to the Profit and Loss account, the gain would *seem* to be $131, which would be $45 *more* than the *true gain* by trade.

**Fish** **Dr.**

| 1826 | | qtls. | Cr. | | |
|---|---|---|---|---|---|
| Jan. 1 | To Stock at $2 - - - | 50 | 1 | 100 | 00 |
| 31 | To Profit and Loss gained - | | 4 | 10 | 00 |
| | | 50 | | 110 | 00 |

**Notes Receivable** **Dr.**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 1 | To Stock for Ja's Lamos's on demand | 1 | 40 | 00 |
| 3 | To Flour for Wm. Richards's " | | 70 | 00 |
| 10 | To Flour for Cha's Dutton's " | 1 | 65 | 00 |
| | | | 175 | 00 |

**Dr.** **Charles Hampden.**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 1 | To Stock - - - - - - | 1 | 25 | 00 |
| | | | 25 | 00 |

**Notes Payable** **Dr.**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 5 | To Sundries to Simon Hill - - | | 30 | 00 |
| 31 | To Balance to Charles Dutton - | 4 | 300 | 00 |
| | | | 330 | 00 |

**Dr.** **Reuben Bradley.**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 4 | To Cash - - - - - - | 1 | 20 | 00 |

**Contra** **Cr.**

| 1826 | | qtls. | Dr. | | |
|---|---|---|---|---|---|
| Jan. 8 | By Adventure to Albany at $2,50 | 20 | 3 | 50 | 00 |
| 31 | By Balance - - - 2,00 | 30 | 4 | 60 | 00 |
| | | 50 | | 110 | 00 |

**Contra** **Cr.**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 9 | By Sundries—James Lamos's - | | 40 | 00 |
| 23 | By Schooner Caroline—Cha's Dutton's | 3 | 65 | 00 |
| 31 | By Balance—William Richards's | 4 | 70 | 00 |
| | | | 175 | 00 |

**Northampton** **Cr.**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 6 | By Cash - - - - - | 1 | 15 | 00 |
| | By Balance - - - - | 4 | 10 | 00 |
| | | | 25 | 00 |

**Contra** **Cr.**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 1 | By Stock to Simon Hill - - | 1 | 30 | 00 |
| 23 | By Schooner Caroline to Cha's Dutton | 3 | 300 | 00 |
| | | | 330 | 00 |

**Worcester** **Cr.**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 1 | By Stock - - - - - | 1 | 20 | 00 |

**Mackerel** **Dr.**

| 1826 | | bbls. | Cr. | | |
|---|---|---|---|---|---|
| Jan. 2 | To Sundries, at $4,50 - | 40 | | 180 | 00 |
| 31 | To Profit and Loss, gained | | 4 | 20 | 00 |
| | | 40 | | 200 | 00 |

**Dr.** **Adventure to Albany**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 8 | To Sundries for amount per the Ruby | | 110 | 00 |
| 31 | To Profit and Loss, gained - | 4 | 20 | 00 |
| | | | 130 | 00 |

**Dr.** **Amos Gilman**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 20 | To Adventure per the Ruby - | 3 | 130 | 00 |
| | | | 130 | 00 |

**Bills Receivable** **Dr.**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 20 | To Amos Gilman for mine to J. Rice | 3 | 100 | 00 |

**Schooner Caroline, my half.** **Dr.**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 23 | To Sundries for Cost - - - | | 450 | 00 |
| 28 | To Cash for my part of repairs - | 1 | 30 | 00 |
| | | | 480 | 00 |

## Contra Cr.

| 1826 | | bbls. | Dr. | | |
|---|---|---|---|---|---|
| Jan. 8 | By Adventure to Albany, at $5,50 | 10 | 3 | 55 | 00 |
| 27 | By Cyrus Bates - - | 10 | 4 | 55 | 00 |
| 31 | By Balance - - - - | 20 | 4 | 90 | 00 |
| | | 40 | | 200 | 00 |

## Per the Ruby Cr.

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 20 | By Amos Gilman for net proceeds | 3 | 130 | 00 |
| | | | 130 | 00 |

## Albany Cr.

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 20 | By Bills Receivable to James Rice | 3 | 100 | 00 |
| 31 | By Balance - - - | 4 | 30 | 00 |
| | | | 130 | 00 |

## Contra Cr.

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 20 | By Sundries to Ja's Rice on A. Gilman | | 100 | 00 |

## Contra Cr.

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 31 | By Balance - - - - | 4 | 480 | 00 |
| | | | 480 | 00 |

**Dr. Cyrus Bates**

| 1826 | | Cr. | | |
|---|---|---|---|---|
| Jan. 27 | To Mackerel, 10 bbls. at $5,50 - | 3 | 55 | 00 |

**Dr. Charles Dutton**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 28 | To Cash, paid repairs on Schr. Caroline | 1 | 30 | 00 |

**Profit and Loss Dr.**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 9 | To Notes Receivable - - | 2 | 20 | 00 |
| 20 | To Bills Receivable - - - | 3 | 1 | 00 |
| 26 | To Cash - - - - - | 1 | 5 | 00 |
| 30 | To ditto - - - - - | 1 | 20 | 00 |
| 31 | To Stock for Net Gain - - | 1 | 86 | 00 |
| | | | 132 | 00 |

**Balance Dr.**

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 31 | To Cash - - - - - | 1 | 318 | 00 |
| | To Flour, for 6 bbls. at $5,50 - | 1 | 33 | 00 |
| | To Fish, for 30 qtls. at 2,00 - | 2 | 60 | 00 |
| | To Notes Receivable for Wm. Richards' | 2 | 70 | 00 |
| | To Charles Hampden - - | 2 | 10 | 00 |
| | To Mackerel 20 bbls. at $4,50 - | 3 | 90 | 00 |
| | To Amos Gilman - - - | 3 | 30 | 00 |
| | To Schooner Caroline, my half - | 3 | 480 | 00 |
| | To Cyrus Bates - - - | 4 | 55 | 00 |
| | To Charles Dutton - - - | 4 | 30 | 00 |
| | | | 1176 | 00 |

**Concord** — Cr.

| 1826 | | Dr. | | |
|---|---|---|---|---|
| Jan. 31 | By Balance - - - - | 4 | 55 | 00 |

**Plymouth** — Cr.

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 31 | By Balance - - - - | 4 | 30 | 00 |

**Contra** — Cr.

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 24 | By Cash - - - - - | 1 | 50 | 00 |
| 31 | By Flour - - - - - | 1 | 32 | 00 |
| | By Fish - - - - - | 2 | 10 | 00 |
| | By Mackerel - - - - | 3 | 20 | 00 |
| | By Adventure to Albany - - | 3 | 20 | 00 |
| | | | 132 | 00 |

**Contra** — Cr.

| 1826 | | | | |
|---|---|---|---|---|
| Jan. 31 | By Notes Payable to Charles Dutton | 2 | 300 | 00 |
| | By Stock for net of my estate - | 1 | 876 | 00 |
| | | | 1176 | 00 |

## TRIAL BALANCE.

| Dr. | | Cr. |
|---|---|---|
| $ 55 | Stock | $ 845 |
| 584 | Cash | 286 |
| 330 | Flour | 329 |
| 100 | Fish | 50 |
| 175 | Notes Receivable | 105 |
| 25 | Charles Hampden | 15 |
| 30 | Notes Payable | 330 |
| ..... | Reuben Bradley* | ..... |
| 180 | Mackerel | 110 |
| 110 | Adventure to Albany | 130 |
| 130 | Amos Gilman | 100 |
| ..... | Bills Receivable | ..... |
| 46 | Profit and Loss | 50 |
| 480 | Schooner Caroline | ..... |
| 55 | Cyrus Bates | ..... |
| 30 | Charles Dutton | ..... |
| 2330 | | 2330 |

*RULES for Journalizing, Posting, and Balancing, by way of question and answer.*

**Q.** 1. How many kinds of accounts are there? or, how are Accounts classed?

**A.** Three: Real, Personal, and Imaginary.

**Q.** 2. What is a Real Account?

**A.** An Account of Merchandize, or any other kind of property.

**Q.** 3. What is a Personal Account?

**A.** An account of a person with whom I have some commercial relation.

**Q.** 4. What is an Imaginary Account?

**A.** A form used by merchants for more plainly methodizing their accounts.

**Q.** 5. Which are the Imaginary Accounts?

**A.** Stock, Profit and Loss, Balance, &c.

**Q.** 6. As Stock represents the merchant, or owner of the books, is it not then a reality?

* The Dr. and Cr. being alike, both are omitted.

*A.* The substance of the account is so, but the title is imaginary by universal custom.

*Q.* 7. What goes to the debit of a real account?

*A.* The number or quantity of that kind, with its cost and every charge or expense attending it.

*Q.* 8. What goes to the credit of a real account?

*A.* What part I sell and the proceeds of it, or any profit or income arising from it.

*Q.* 9. When is a personal account debited?

*A.* When he becomes accountable to me for any sum.

*Q.* 10. When is a personal account credited?

*A.* When I become accountable to him for any sum.

*Q.* 11. What is the debtor to be used in shipping goods?

*A.* When the shipper's goods are on freight, &c. or in a chartered vessel, the Title is *Adventure*, but when he ships merchandize in his own vessel, the Title is *Voyage* or *Shipment*. When goods are shipped on commission, the employer is to be charged with cost, &c.

*Q.* 12. What goes to the debit of Profit and Loss?

*A.* What I lose.

*Q.* 13. What goes to its credit?

*A.* What I gain.

*Q.* 14. Is Profit and Loss never debited but when you lose, or credited, but when you gain?

*A.* In order to transfer the gain or loss to the account of stock when closing the books, it is then necessary to debit it when I gain, and credit it when I lose.

*Q.* 15. When there is an accession of money or other property to your stock, for which you are to make no equivalent—do you credit Profit and Loss?

*A.* Money acquired or expended by a merchant in the line of his business, without any direct equivalent, must be carried to the account of Profit and Loss. But legacies and donations go to the stock account, otherwise the books do not give a fair representation of the business.

*Q.* 16. How do you distinguish between the terms *Cash Account* and *Cash Book*?

*A.* As in business, many articles will necessarily fall to the Cash account, by which it would soon be filled, Merchants keep a distinct book for it, called the Cash Book, in which the several receipts and payments are daily entered, as they happen, and thence generally once a month regularly post-

ed, making but one line on each side, in the Cash Account in the Leger.

*Q.* 17. What is meant by the term *Petty Leger* ?

*A.* As in almost every business, it may be necessary to debit or credit certain persons, for comparatively small sums, and by carrying these to the *Leger*, it would soon be filled, it is found convenient to keep a *distinct* book for such purpose, and this is termed the *Petty Leger*.

*Q.* 18. What goes to the debit of Balance ?

*A.* What ready money I have on hand, my effects at home or abroad, and the debts due to me.

*Q.* 19. What goes to its credit ?

*A.* What I owe when balancing my books.

*Q.* 20. What goes to the debit of stock ?

*A.* The amount of the debts which the merchant owes when the books are opened.

*Q.* 21. What goes to its credit ?

*A.* The amount of cash, goods, debts, and any other property then belonging to him.

*Q.* 22. Where is the stock account to be placed ?

*A.* On the first page of the Leger.

*Q.* 23. How do you balance a personal account, when he owes you ?

*A.* I make balance debtor to him for the amount due, and credit him by balance for the same.

*Q.* 24. When you owe him ?

*A.* I make him debtor to balance for the amount due to him, and credit balance by him for the same.

*Q.* 25. How do you balance a real account ?

*A.* A real account is balanced by Profit and Loss, Balance, or both, as the case may be.

1st. By Profit and Loss, when the whole of the article is sold to a gain or loss.

If to a gain the account is made debtor to Profit and Loss for the gain, and Profit and Loss is credited for the same, and the reverse when there is a loss.

2d. By Balance, when the whole of the article remains on hand. Then Balance is made debtor to the article for the part, number, or quantity on hand, and its whole cost, and the account is credited for the same.

3d. By both Balance and Profit and Loss. When a part of the article is sold to gain or loss, this part is balanced as in the first case, and the remaining part is balanced as in the second.

*Q.* 26. How is a real account closed by a double balance?

*A.* Balance is made debtor for amount of the debtor side of the account, and the account is credited by balance for the same, and then the account is made debtor to Balance for amount of the credit side, and Balance account is credited for the same.

*Q.* 27. What is the use of a double balance?

*A.* A real account, closed by a single balance will show only the part remaining on hand and its proportional cost in the new books; but when closed by a double balance, the debit and credit sides of the account will appear in the new account as they did in the old.

*Q.* 28. You have now balanced the real and personal accounts; what is next to be done?

*A.* To ascertain the gain or loss from the account of Profit and Loss, and transfer it in the usual way to the Stock account; and as the Dr. side of the Balance account contains the money and goods, &c. on hand, and the debts due to me; and on the credit side it contains what debts I owe; the difference between them is the net of my estate, which, on being transferred to its place in the account of Stock, will make both sides equal, if the books be correct; and by the balancing of these three accounts is meant by accountants' closing the books.

*Q.* 29. Will you state more particularly what you ascertain by balancing the accounts and closing the books?

*A.* From the personal accounts I ascertain what there is due to or from each person. From the real accounts respectively, the part or quantity on hand, and the cost and charge attending it. The Profit and Loss account shows the *several* gains and losses; the balance account gives a collected view of the several branches of the business, and thence I readily see my net stock; and when the difference between the debit and credit of balance is transferred to the Stock account, it shows the present state of the business, contrasted with its state when the books were opened.

*Q.* 30. May not the gain or loss be ascertained without an account for that purpose?

*A.* The difference between the net Stock at the beginning, taken from the Stock account, and the net Stock at closing, taken from the balance sheet or account, is the gain or loss, but it is of importance to know the particulars.

*Q.* 31. Would you proceed thus at the end of each year?

*A.* Yes; if a new set of books was to be opened, or the business discontinued, but if the business is still going on in the same set of Books, and the balances taken only to know the state of the business, I would carry the balances to a balance sheet, which I would transcribe at the end of the journal, and leave the books open.

*Q.* 32. Would you always value the property at cost, when closing?

*A.* If, as before observed, the business is to be continued without any change in the firm, as some goods may be higher, and some lower than when purchased, I would generally value them at the cost. But if there is to be a change in the firm, or circumstances require it, I would rate the property at the actual value; and in order to make a true estimate of Profit and Loss, I would charge interest on all property as well as on debts.

*Q.* 33. You have closed the sales of goods received on consignment, how would you state the Journal Entry?

*A.* I would ascertain the several expenses from the subsidiary books, find the commission, and Del credere or guaranty, if any, deduct these with the amount already charged for freight, &c. from the Sales, and then say—

Sales of Merchandize, &c. *or* Sales No. —— } Dr. to Sundries.

To Charges on Merchandize for Storage, &c. &c. - $
To Commission on $ at per cent. - - -
To A. B. for net proceeds to his credit - - - -

But if the goods were sold on credit, and not guarantied,
To A. B. for net proceeds when collected - - -

*Q.* 34. Would you include the Guarantee in the Commission account?

*A.* As Guarantee or Del credere, which is the insurance of personal debts, is a real adventure, it ought to be distinctly recorded, instead of being entered with the commission, as is usually done.

*Q.* 35. Mr. D—n, of London, advises you that he has received from Antwerp, a bill of £750 sterling, $\frac{3}{4}$ths of it belonging to you, and $\frac{1}{4}$th to B. but the *whole* at maturity to *your* disposal: How would you state it?

*A.* Mr. D—n, or the proceeds of the bill, if realized, would be the Dr. and B. will be Cr. for his part, the Cr. for *my* part is to be ascertained from what has produced it.

*Q.* 36. Suppose A. and B. each possessing $2000 in cash, agree to take a store to trade in partnership, and give you the charge of their books, how would you state the business?

*A.* I would make Cash Dr. to Stock for 4000, and then make Stock to A. for $2,000.
" " B. " 2,000.

As the business proceeds, I would make Merchandize Dr. for cost of the goods, and also for all expenses attending the business.—And Cr. Merchandize* for the amount of the Sales, keeping a particular account of the cash sales of each day, to be transferred to the Journal at stated times. Make the Bank Dr. for deposits, and Cr. it for the checks drawn on it. Charge the partners for what they have from the store, keeping their accounts as individuals, separate from the partnership accounts. And in proper time, on taking an inventory of the goods in the store, to know the amount of the stock on hand, I would balance the books on a separate sheet in the usual manner, to ascertain the gain or loss by the business.

*Q.* 37. Suppose that on examining their books at the end of six months, A. and B. find the cash on hand to be $3900, and that the debts, both active and passive, are discharged, except $150 due from *each* of the partners, on his private account, and that with a view to close the business, they sell the remainder of their stock at auction for $700 in cash, and then divide the whole. Admitting the Cr. of Merchandize to exceed the Dr. by $900, giving that sum for the net gain, how would you make the closing statements—omitting the Profit and Loss account?

*A.* I would make Merchandize Dr. to each of the partnership accounts for their shares of the gain, and charge them with the sums due on their private accounts. Charge the partnership accounts with the cash paid on dividing, when they would respectively show on the Cr. $2450 for the Stock advanced, and gain by trade—and on the Dr. $2450 for the cash paid on closing, and the transfer from the private account. And thus, the Merchandize, Cash, private and partnership accounts, would be severally closed.

* This is the term used in Retail business, where the minuteness of the sales forbids the record of their quantities.

*QUESTIONS in which the materials or Waste-Book Entries are given to be formed into Accounts, designed to teach Book-Keeping on the plan that has so long been successfully used in Arithmetic.*

## WASTE-BOOK.

### *No* 1.

| | | | |
|---|---|---|---|
| Jan. 1 | I have in Cash, - - - - - | 100 | 00 |
| 2 | Bought for Cash 8 bbls. of Flour at $6,50 | 52 | 00 |
| 4 | Sold William Baker on account 2 bbls. of Flour at $7,50 - - - - - | 15 | 00 |
| 5 | Sold James Jones for cash 4 bbls. of Flour at $7,50 - - - - - - | 30 | 00 |

It is required to journalize and post these cases, make a trial balance, balance the accounts, and close the Leger, and from the balance account form an inventory for a new set of books.*

*Result of the Statements, viz.*

| | | |
|---|---|---|
| I have in Cash - - - - - | | $78,00 |
| 2 bbls. of Flour at $6,50 - - | | 13,00 |
| William Baker owes - - - | | 15,00 |
| | Net Stock | 106,00 |
| | Net Gain | $6,00 |

* We should always keep in view a rule of the greatest importance in teaching, that the advances in a difficult art cannot be too easy and gradual.

## No. 2.

| | | | |
|---|---|---|---|
| Jan. 10 | I have in Cash - - - - | 120 | 00 |
| 12 | Bought of William Rice for Cash, 30 quintals of Fish, at $2,25 - - - | 67 | 50 |
| 14 | Sold David Steele 10 quintals of Fish, at $2, 5, and received his note on demand | 27 | 50 |
| 18 | Sold Hiram Flint on account 6 quintals of Fish, at $2,75 - - - - | 16 | 50 |
| 20 | Received in Cash from Hiram Flint on account, ten dollars - - - | 10 | 00 |
| 25 | Sold Amos Gilman for Cash 8 quintals of Fish, at $2,75 - - - - | 22 | 00 |

*Required the Result.*

| | | |
|---|---|---|
| I have in Cash - - - - | | $84,50 |
| 6 quintals Fish, at $2,25 - - | | 13,50 |
| David Steele's note for - - - | | 27,50 |
| Hiram Flint owes - - - - | | 6,50 |
| | Net Stock | 132,00 |
| | Net Gain | $12,00 |

## No. 3.

| | | | |
|---|---|---|---|
| Feb. 1 | I have on hand 20 bbls. Flour at $5,00 | 100 | 00 |
| 4 | Sold William Lamos on account 4 bbls. of Flour at $5,50 - - - - | 22 | 00 |
| 6 | Sold Richard Mott for cash 5 bbls. of Flour at $5,50 - - - - - | 27 | 50 |
| 8 | Sold Thomas Duff 3 bbls. of Flour at $5,50 and received his note on demand - | 16 | 50 |

| | | |
|---|---|---|
| Feb. 10 | Bartered with Simon Gale 3 bbls. of Flour for $6, for 2 bbls. of Beef at $9 - | 18 00 |
| 2 | Received from William Lamos on account fifteen dollars - - - - - | 15 00 |
| 15 | Paid for taxes, &c. - - - - - | 3 50 |

*Result.*

| | |
|---|---|
| I have in Cash - - - - - | $39,00 |
| 5 bbls. Flour at $5 - - - | 25,00 |
| 2 bbls. of Beef at $9 - - - | 18,00 |
| Thomas Duff's note for - - - | 16,50 |
| William Lamos owes - - - | 7,00 |
| Net Stock | $105,50 |
| Net Gain | $5,50 |

## *No.* 4.

| | | |
|---|---|---|
| Mar. 1 | I have in Cash sixty dollars - - | 60 00 |
| 2 | Bought for Cash 5 bbls. Flour at $4,50 | 22 50 |
| 3 | Sold for Cash 2 bbls. of Flour at $6,00 | 12 00 |
| 5 | Sold William Coin 2 bbls. of Flour on acc't at $6,00 - - - - - - | 12 00 |
| 7 | Received from William Coin in cash on account eight dollars. - - - - | 8 00 |
| 8 | Paid for Rates two dollars fifty cents | 2 50 |
| 10 | Bought for Cash 4 bbls. of Beef at $9,50 | 38 00 |
| 12 | Sold for Cash 3 bbls. of Beef at $10,50 | 31 50 |
| 15 | Lent Reuben White on his note twenty dols. | 20 |

*Result of No. 4.*

| | | |
|---|---|---|
| In Cash - - - - - | | $28,50 |
| 1 bbl. of Flour - - - - | | 4,50 |
| 1 " " Beef - - - - | | 9,50 |
| Reuben White's note for - - | | 20,00 |
| William Coin owes - - - | | 4,00 |
| | Net Stock | $66,50 |
| | Net Gain | $6,50 |

## *No 5.*

| | | | |
|---|---|---|---|
| Jan. 1 | I have in Cash - - - 200,00<br>12 pieces of Linen at $20 - 240,00 | 440 | 00 |
| 3 | Sold for Cash 2 pieces of Linen at $24 | 48 | 00 |
| 4 | Sold Thomas Abram on account 3 pieces of Linen at $25 - - - - - | 75 | 00 |
| 8 | Sold Joseph Hampton 3 pieces of Linen at $25 and received his note on demand | 75 | 00 |
| 10 | Bartered with Samuel Wilton 2 pieces of Linen at $26, for 10 bbls. of Flour at $5,20 | 52 | 00 |
| 12 | Paid Rates and Postage - - - | 2 | 75 |
| 15 | Received from Thomas Abram on account | 45 | 00 |
| 16 | Paid Sundry expenses - - - | 1 | 50 |

*Result of No. 5.*

| | | |
|---|---|---|
| I have in Cash - - - - | | $288,75 |
| 2 pieces of Linen at $20 - - | | 40,00 |
| Joseph Hampton's note for - - | | 75,00 |
| 10 bbls. of Flour at $5,20 - - | | 52,00 |
| Thomas Abram owes me - - | | 30,00 |
| | Net Stock | $485,75 |
| | Net Gain | $45,75 |

## No. 6.

| | | | |
|---|---|---|---|
| Jan. 15 | I have in Cash - - - $250,00<br>James Lawson owes me on acc't 75,00 | 325 | 00 |
| " | I am indebted on acc't to Darius Merrill | 30 | 00 |
| 16 | Bought of James Joy on acc't 40 yds. Cloth at $4,00 - - - - - - | 160 | 00 |
| 19 | Sold Moses Sands on acc't 10 yds. of Cloth at $4,50 - - - - - - | 45 | 00 |
| 20 | Bought of Richard Holland 5 bbls. of Beef at $9,50, and gave him my note at 10 days - - - - - - - | 47 | 50 |
| 25 | Paid James Joy per receipt - - | 80 | 00 |
| 26 | Received from Moses Sands on account | 25 | 00 |
| " | Sold James Rose for Cash 20 yards Cloth at $4,50 - - - - - - | 90 | 00 |
| 27 | Paid a wager of - - - - - | 5 | 00 |
| 28 | Received for a wager - - - | 3 | 00 |
| 30 | Paid rent and taxes - - - | 5 | 75 |

*Result of No. 6.*

| | | |
|---|---|---|
| I have in Cash - - - - | | $277,25 |
| 10 yds. of Broadcloth at $4 - - | | 40,00 |
| 5 bbls. of Beef at $9,50 - - | | 47,50 |
| James Lawson owes me on account | | 75,00 |
| Moses Sands do. do. | | 20,00 |
| | | $459,75 |
| I am indebted to James Joy on acc't | $80,00 | |
| " " Darius Merrill " | 30,00 | |
| " " Richard Holland on note | 47,50 | |
| | | 157,50 |
| Net Stock | | $302,25 |
| Net Gain | | $7,25 |

## No. 7.

| | | | |
|---|---|---|---|
| Jan. 1 | I have in Cash - - - | $120,00 | |
| | 50 hhds. of Salt at $4 - - | 200,00 | |
| | 20 bbls. of Beef at $9 - - | 180,00 | |
| | James Booth owes me on account | 26,00 | |
| | | | 526 00 |
| " | I am indebted, viz. | | |
| | To William Barnes on acc't - | 25,00 | |
| | To Arthur Davis on my note - | 37,00 | |
| | | | 62 00 |
| 2 | Sold James Green for Cash 10 hhds. of Salt at $4,50 - - - - | | 45 00 |
| 3 | Sold Richard Payton on his note at 30 days 5 bbls. of Beef at $9,60 - - | | 48 00 |
| 4 | Received from James Booth, on acc't | | 12 00 |
| 8 | Paid William Barnes on acc't - - | | 15 00 |

| | | | |
|---|---|---|---|
| Jan. 10 | Paid for Sundry expenses - - | | 7 50 |
| 15 | Paid William Barnes in full - - | | 10 00 |
| 16 | Received from James Booth in full - | | 14 00 |
| 17 | Sold Jas. Hammond 10 hhds. Salt at $4,50 and received in part twenty dollars | | 20 00 |
| 25 | Bought of David Smith 10 bbls. of Flour at $5,00, and paid him, viz. | | |
| | 3 bbls. of Beef at $9,50 - - | 28,50 | |
| | Remainder in Cash - - - | 21,50 | |
| | | | 50 00 |
| 26 | Paid my Subscription to the Reading Room | | 5 00 |
| 28 | Sold for Cash 10 hhds. Salt at $4,50 | | 45 00 |

*Result of No. 7.*

| | |
|---|---|
| I have in Cash - - - - | $197,00 |
| 20 hhds. Salt at $4,00 - - - | 80,00 |
| 12 bbls. Beef " 9,00 - - - | 108,00 |
| 10 do. Flour " 5,00 - - - | 50,00 |
| Thomas Hammond owes me on acc't | 25,00 |
| Richard Payton on his note - - | 48,00 |
| | $508,00 |
| I owe to Arthur Davis on my note | 37,00 |
| Net Stock | 471,00 |
| Net Gain | $7,00 |

## *No.* 8.

| | | | |
|---|---|---|---|
| Jan 1 | I have in Cash - - - | $153,00 | |
| | 5 bbls. of Flour at $6,50 - - | 32,50 | |
| | 2 " " Beef " 9,50 - - | 19,00 | |
| | John Steele's note for - - | 28,00 | |
| | David Winter owes me on acc't | 20,00 | |
| | | | 252 50 |

| | | | |
|---|---|---|---|
| Jan 1 | I owe Richard Gilman on my note - | | 40 00 |
| 2 | Bought of Benjamin Bates 10 quintals of Fish at $3,00 | | |
| | Paid him in Cash - - - | $10,00 | |
| | My note on demand for balance | 20,00 | |
| | | | 30 00 |
| 4 | Sold Edmund Blake for Cash 5 quintals of Fish at $3,50 - - - - | | 17 50 |
| 7 | Sold Simon Chambers on his note on demand | | |
| | 5 bbls. Flour at $7,50 - - | $37,50 | |
| | 2 " Beef " 9,00 - - | 18,00 | |
| | | | 55 50 |
| 10 | Taken up my note to Richard Gilman, viz. | | |
| | Paid for principal - - - | $40,00 | |
| | " " 5 months' interest - | 1,00 | |
| | | | 41 00 |
| 12 | Bought of William Deal on my note on demand, 12 bbls. of Oil at $8,00 - | | 96 00 |
| 13 | Received payment of John Steele's note, viz. | | |
| | For principal - - - - | $28,00 | |
| | For 6 months' interest - - | 84 | |
| | | | 28 84 |
| 15 | Sold Thomas Gale on his note on demand 6 bbls. of Oil at $9,00 - - - | | 54 00 |
| 16 | Lent James Mace on his note on demand | | 30 00 |
| " | David Winter has failed and compounded with his creditors, paying 60 per cent. I have signed the discharge and received | | 12 00 |
| 25 | Paid for rent and taxes - - - | | 5 00 |

*Result of No. 8.*

| | | |
|---|---|---|
| I have in Cash - - - - | | $125,34 |
| 5 qtls. of Fish at $3 - - - | | 15,00 |
| 6 bbls. of Oil at $8 - - - | | 48,00 |
| John Chambers's note for - - | | 55,50 |
| Thomas Gale's " " - - | | 54,00 |
| John Mace's " " - - | | 30,00 |
| | | 327,84 |
| I owe as follows, | | |
| To Benjamin Bates on my note | $20,00 | |
| To William Deal " " " - | 96,00 | |
| | | 116,00 |
| Net Stock now | | 211,34 |
| " " at beginning | | 212,50 |
| The result is a loss of | | ,66 |

## *No.* 9.

| | | | |
|---|---|---|---|
| Jan. 1 | Inventory of Money, Goods, and Debts belonging to me A. B. and also of what I owe. | | |
| | I have in Cash - - - | $125,34 | |
| | 75 quintals Fish at $3 - - | 225,00 | |
| | 50 bbls. No. 1 Mackerel at $4,75 | 237,50 | |
| | William Chulmley's note on demand | 30,00 | |
| | Peter Bonham's " " | 55,50 | |
| | James Ashworth owes me on account | 54,00 | |
| | | | 727 34 |
| 1 | I owe as follows, | | |
| | To William Lamos on my note due on demand - - - - - | $96,00 | |
| | To Henry Panton on account | 20,00 | |
| | | | 116 00 |
| 4 | Received a legacy of - - - | | 50 00 |

| | | | |
|---|---|---|---|
| Jan. 5 | Paid William Lamos and endorsed on my note - - - - - - - - | | 50 00 |
| 7 | Received from William Chulmley and endorsed on his note - - - | | 20 00 |
| 8 | Received for relinquishing my purchase of the Schooner Jane at Auction - | | 50 00 |
| 10 | Shipped on board the Caroline, A. Hillman, for Albany, consigned to Thomas Pemberton on my account and risk, viz.<br>60 quintals Fish at $3,25 - - $195,00<br>Paid Sundry Charges at shipping 15,00 | | 210 00 |
| 11 | Shipped on board the Jane, Charles Adams, for Philadelphia, by order and for account of Wilson & Vanelli, viz.<br>40 bbls. No. 1 Mackerel at $5 $200,00<br>Paid Charges at shipping - 10,00 | | 210 00 |
| 13 | Transferred by order of Henry Panton, ten dollars from his account to the credit of James Ashworth - - - - | | 10 00 |
| 14 | Having agreed with the B. H. Insurance Company on a Policy of Insurance of Shipments per Caroline and Jane, I have given my note for the premium, viz.<br>To cover $210, for Wilson & Vanelli, at 3 per cent. - - - - $6,49<br>To cover $210 for self at 3 per cent. 6,49 | | 12 98 |
| 17 | Transferred by desire of William Lamos to the use of Peter Bonham and endorsed on their respective notes - - | | 30 00 |

| | | | |
|---|---|---|---|
| Jan. 20 | Received per the Dispatch, Stanley, from Philadelphia, 60 bbls. Flour shipped by James Allison by my order and on my account, | | |
| | Amount per Invoice - - | $277,15 | |
| | Paid Freight, &c. at receiving - | 20,85 | |
| | | | 298 00 |
| 23 | Received per the Volant, Seymour, from Baltimore, 40 bbls. Flour, consigned to me by David Aveline on his account. | | |
| | Paid Freight, &c. at receiving - - | | 20 15 |
| 24 | Sold Andrew Wood for Cash, viz. | | |
| | 20 bbls. of David Aveline's Flour at $6,25 - - - - - | $125 | |
| | 20 bbls. of my own, at $6,25 - | 125 | |
| | | | 250 00 |
| 26 | Paid James Allison's draft at sight for Flour per the Dispatch - - - - | | 277 15 |
| 29 | Received on Sale of the remaining 20 bbls. of David Aveline's Flour at Auction | | 141 00 |
| 31 | Closed David Aveline's Sales of Flour, viz. | | |
| | Amount of Sales - - - | $266,00 | |
| | Freight, &c. already charged - | 20,15 | |
| | Wharfage, Storage, and Advertising | 5,85 | |
| | Commission on $266 at 2 per cent. | 5,32 | |
| | Net proceeds to his credit - | 234,68 | |
| | | | 245 85 |
| Feb. 1 | Refunded to Andrew Wood for abatement on Flour sold him Jan. 24, viz. | | |
| | On account of David Aveline - | $5,00 | |
| | On my own account - - - | 5,00 | |
| | | | 10 00 |
| 2 | Accepted David Aveline's bill in favour of Alfred Dunning, payable in three days | | 234 68 |

| | | | |
|---|---|---|---|
| Feb. 3 | Received Cash for 31 bbls. of my Flour at auction - - - - - - | 195 | 00 |
| 6 | Paid for David Aveline's bill - - | 234 | 68 |
| 7 | Paid my Subscription to the Suffers by fire at A. - - - - - - - | 20 | 00 |
| 10 | Paid my Subscription to the Reading Room | 5 | 00 |
| 1 | Received from Thomas Pemberton of Albany his account of sales of Fish per the Caroline, the net proceeds being - | 250 | 00 |
| 14 | Received from Henry Wanstead of New-York, two bills of $500 each, B.B. Bank, to be invested in the purchase of goods for his account at the Ganges's sales. These I have deposited in the B. B. Bank. | 1000 | 00 |
| 17 | Received per the Louisiana from New-Orleans, 20 bales Cotton, consigned to me by Walter Howard for sale on his acc't. Paid Freight, &c. - - - - | 44 | 25 |
| 20 | Received Cash for my Bill of $250, on Thomas Pemberton of Albany, in favour of John Grant, at 2 per cent. discount | 245 | 00 |
| 23 | Sold William Carlton for Cash, Walter Howard's Cotton, weighing net 4000 lbs. at 20 cts. per lb. - - - - | 800 | 00 |
| 24 | Closed Walter Howard's sales of Cotton, viz. Amount of Sales - - - $800,00<br>Freight, &c. already charged - 44,25<br>Wharfage, Storage, and Advertising 5,75<br>Commission on $800 at 2½ per cent. 20,00<br>Net proceeds to his credit - 730,00 | 755 | 75 |

| | | |
|---|---|---|
| Mar. 1 | Received cash for my bill of $220,90 on Wilson and Vanelli of Philadelphia, for amount per the Jane, in favour of George Rose, drawn by their desire, on sale of which I discounted 2 per cent. which they allow | 216 43 |
| 2 | Having purchased for cash of Wm. Grant at 6 per cent. discount, his bill of $768,91 on Thomas Deane of New-Orleans, in favour of Walter Howard, I have this day forwarded it to him. One per cent. commission being reserved on the purchase, the balance due to him, and which I have paid for a bill, is - - - - | 722 78 |
| 3 | Shipped on board the Adeline, James Sidney, for New-York, for account of Henry Wanstead, sundry Merchandize purchased by his order at the Ganges's sales, viz.<br>Amount of Goods per bills - $905,75<br>Charges at shipping - - 22,25<br>Commission on $928, at 5 per cent. 46,40<br>Paid Premium of Insurance to cover the amount at 2 per cent. - 19,83<br>Discharged the whole per checks on the B. B. Bank. | 994 23 |
| 4 | Paid Henry Panton the balance of his acc't | 10 00 |
| 5 | Received from James Ashworth the balance of his account - - - - - | 44 00 |
| 6 | Paid William Lamos the balance due on my note - - - - - - | 10 00 |
| 7 | Received from Peter Bonham the balance due on his note - - - - | 25 00 |
| 8 | Received from William Chulmley the balance on his note - - - - | 10 00 |
| 9 | Paid for Rent and Taxes - - - | 9 |

*Result of No. 9.*

| | | |
|---|---|---|
| I have in Cash - - - - | | $725,52 |
| 15 quintals Fish at | $3,00 - | 45,00 |
| 10 Barrels Mackerel at | 4,75 - | 47,50 |
| 9 ditto Flour at | 4,96⅔ - | 44,70 |
| David Aveline owes on account | - | 5,00 |
| B. B. Bank, - - per deposit | - | 5,72 |
| | | $873,44 |
| I owe, viz. | | |
| To William Wanstead - - | $5,72 | |
| To B. H. Insurance Company on my note - - - - - | 12,98 | |
| | | 18,70 |
| Net Stock - - | | 854,74 |
| Net Gain by *Trade* | | 213,40 |

*The cases following are given, not so much as examples for calculation, as to habituate youth to the understanding and arrangement of complicated accounts, by single entry.**

1. G. bought and sold for cash the following lots of Flour, viz. Jan. 1, he bought 50 bbls. at $5,75 per bbl.—On 15th, 20 bbls. at $5,60—On 16th he sold 65 bbls. at $6,25—On 17th he bought 10 bbls. at $6,75—June 5th he bought 16 bbls. at $5,50, and on 19th, 19 bbls. at $6,80—On 5th August he bought 30 bbls. at $6,50, and on 25th he sold 68 bbls. at $6,60—Sept. 12, he bought 43 bbls. at $5,80, and on 15th, he sold 10 bbls. at $6, and on 18th 30 bbls. at $5,60—On 5th Oct. he bought 15 bbls. at $6, and on 24th he sold 20 bbls. at $6,12½. How many bbls. has he on hand, and what is his gain or loss, estimating what remains at $6,25 per bbl. ?

*Ans.* 10 bbls.
*Gain*, $49,45.

* For the desolate widow, lost in the perplexities of business, and terrified with her forlorn condition, let him *disentangle complicated accounts.*—AIKIN's Letters to his Son, Art. *Consolation.*

2. On 1st May, B. of —— had of H. of —— 10 bbls. of Flour at $6,75 per bbl. and paid him in part, $25 in cash. On 15th he had of H. 31 galls. of Molasses at 30 cts. and a bbl. at 83 cts.—19th, he delivered to H. 30 qtls. of Fish at $2,50, and took 20 yds. of Baize at 50 cts.—June 3, B. had 250 lbs. of Coffee at 24 cts. and 10 lbs. of Chocolate at 25 cts. —July 27, B. brought to H. 4 bbls. of Oil at $10, and on 31st he sent to H. 4 bbls. Salmon, at $10,50, when H. paid his order to J. M. for $12,50 and delivered per his order to D. L. 903 lbs. Sugar at 7 cts.—Sept. 6th, A. paid B's note to G. for Cordage, on which H. was endorser, viz. for principal $65,94, and $1,87 for interest—On 10th B. brought to him 5854 feet of boards at $11,50 per thousand, and 10 bbls. No. 1 Mackerel at $5. A settlement was then made, and he was furnished with his account, and the balance paid in cash. What was the amount, and in whose favour?

Ans. $5,67 in favour of B.

3. James and John have lived together 8 years in John's house, the rent of which is stated at $50 per annum. James's bill for supplies is $1546,46 and John's bill $497,24, and he has James's note for $560,80 without interest. Required the balance on stating their *accounts*, and in whose favour.

Ans. $236,19 due to John.

4. Two Carpenters, A. and B. who have each an apprentice, engage to finish a piece of work for $630. By agreement between them, A's apprentice is to be allowed 62½ cts. per day, and B's 100 cts. When the work was finished, it appeared that A. worked 120 days, and his apprentice 100. B. worked 96, and his apprentice 135½ days. Supposing that, while doing the work, they received each $210. What is each person's share of the remaining payment, on stating their accounts? Ans. $92,50 due to A. $117,50 due to B.

5. A person failing in trade, owed to A. $100, B. $200, C. $400, to D. $350, and his property consisted of

| | | | | |
|---|---|---|---|---|
| 33½ | yards | Broadcloth | worth | $5,75 per yard. |
| 57⅜ | " | Cassimere | " | 2,46 " |
| 136⅞ | " | Linen | " | 86 " |
| 229¼ | " | Flannel | " | 38 " |
| 58 | lbs. | Tea | " | 1,20 per lb. |
| 254 | " | Sugar | " | 9 " |
| 5 | bbls. | Flour | " | 5,75 per bbl |

which was assigned for benefit of his creditors. The commission on Sale of the goods, at the appraised value was at $2\frac{1}{2}$ per cent. and the Assignees' bill $43,50. On exhibiting their statement to the creditors and paying the dividends, how much was there paid to each, and how much did he pay on the dollar? Ans. $57,14 to A. / 114,29 to B. / 228,57 to C. / 200,00 to D. } at 57$\frac{1}{7}$ cents per dollar of the debt.

6. G. being employed in working for E. at $1,25 per day, takes the following articles, viz.

May 1, he took a barrel of Flour, at $6,75
June 29 " 14 lbs. Sugar, for $1,50
July 17 " 20 yds. Sheeting at 30 cts. per yd.
" 25 " 12 lbs. Butter at 14 cts. per lb.
" 26 " 1 lb. Tea, at 90 cts. per lb.
Aug. 23 he received $20 in cash, per receipt.
Sept. 19 he took 3 yds. Broadcloth at $5 per yd.

And on presenting his bill for 90 days' work, commencing on the 25th April, and ending Sept. 30, it is thus adjusted. E. gives up G's note dated Jan. 1, for $100, with interest, on which there is an endorsement, dated June 16 following for $60, and the settlement is made on 30th Sept. when G. received his bill and the balance due to him in Cash. How much was it? Ans. $17,22,

7. A. and B. are equal owners of the ship Columbus. A. as agent receives for freight $5089,60 and his bill against the ship is $5140,80.—B's bill is $429,20. What is the balance on stating an account with each?

Ans. $189,04$\frac{1}{2}$ due to B.

8. In order to close a voyage, sundry articles and small stores from the Schooner Sarah, owned equally by A. B. C. and D. were sold at auction, and purchased chiefly by the owners, viz. A. $13,38, B. $82,50, C. $63,66, and for Cash, $6,25. It is required to *adjust* this business.

Ans $28,06$\frac{3}{4}$ due to A. *also* $41,05$\frac{1}{4}$ due from B.
41,44$\frac{3}{4}$ " " D. 22,21$\frac{1}{4}$ " " C.
6,25 in Cash.
69,51$\frac{1}{2}$ 69,51$\frac{1}{2}$

9. C. D. owner of the Fishing Schooner, Hannah, of 100 tons, agreed with J. P. and 12 fishermen to fit her for the Labrador fishery on shares; the vessel to draw one quarter part of the proceeds, after deducting the *Great General* for salt, boats, seines, nets and candles, which in this case amounted to $850. And of the other three quarters, each man was to receive one thirteenth part, after deducting the *Small General* for provisions and small stores, amounting to $550. They were absent four months, and returned with a cargo of Fish and Oil, viz.

| | | | |
|---|---|---|---|
| 1000 quintals, which sold at 13*s*. | - | - | $2166,67 |
| 28 barrels Oil, " $12 | - | - | 336,00 |
| Bounty received from Government | - | - | 360,00 |

The tonnage bounty is $4 per ton, but in no case to exceed $360.

C. D. also, as owner of the schooner Mary of 47 tons, agreed with S. C. and five fishermen to fit her for a Mackerel voyage on shares. The owner to draw one quarter of the proceeds, after deducting the *Great General* which amounted to $160. Each man to receive one sixth of the other three quarters, after deducting the *Small General*, which amounted to $52. They were absent 6 weeks, and returned with 125 barrels of Mackerel, viz.

| | | | |
|---|---|---|---|
| 60 Bbls. No. 1 which sold at | $5,00 | - | $300 |
| 50 " No. 2 - - | 4,50 | - | 225 |
| 15 " No. 3 - - | 4,00 | - | 60 |

Required C. D's share of the proceeds for his vessels and supplies, and the respective shares of the fishermen?

Ans. C. D's part as owner - - $609,41
" " for supplies - - 1612,00
J. P. & Co. in the Hannah—each 73,80$\frac{11}{13}$
S. C. & Co. " Mary— " 44,45$\frac{5}{6}$.

10. On the 31st December 1825, the Dr. side of A's *account* with B. was - - - - - $6281,78
And the Cr. side was - - - - - 6300,00
The Sum of the Dr. of *interest account* with him was 262,06
" " Cr. " " " 296,25
How much is the balance, and in whose favour?

Ans. $52,41 due to B.

11. Three Carpenters, A. B. and C. agree with G. to build a store and find the materials for $1000, of which 600 were to be paid in advance, and the remainder when the work

was finished. B. and C. take $50 each, of the first payment. When the work was completed, it appeared by A's account, who received the money and paid the bills, for which he was allowed a compensation of $10, that he had paid $648,95, exclusive of the payments to B. and C. and that he had worked 63 days. B. worked 51 days, and he was allowed $20 for the use of his shop, &c. C. worked 60 days, and his bill for boarding the men they hired was $68,75. A. on settling with G. and allowing him $23,15 charged to B. and $17,48 charged to C. receives the balance in Cash, and on exhibiting his *statement* of the business to B. and C. he pays to each the balance due. How much did they make per day, and how was the last payment disposed of?

Ans. $1,45 per day, and B. rec'd $20,80,
C. $88,27, and A. $250,30.

12. A. B. and C. agreed on an entertainment, to which some friends were invited. A. and B. supplied the provisions, &c. in 8 baskets of equal cost. Five of which were supplied by A. and three by B. When the entertainment was finished, C. laid down $12,64 for his part, which was to be shared by A. and B. but disagreeing in the division of it, they referred it to D. who awarded to each his part, and proved the justness of his decision by stating it in an account. Required the amount awarded to each.

Ans. $11,06 to A.
1,58 to B.
Paid by C. $12,64

13. Four persons, B. C. D. and E. equal owners of the Brig Pilgrim, and cargo, from Havana, agree to take to their own use, 45 hhds. of the Molasses, and 4 hhds. of the Coffee on board, and to account for excess or deficiency in dividing at 30 cts. per gallon for Molasses and 24 cts. per lb. for Coffee.

| *Contents of the Molasses.* | | | | *Weight of the Coffee.* | | | |
|---|---|---|---|---|---|---|---|
| hhds. | marks | wants | | hhds. | | lb. | |
| 12 | 1329 galls. | 72* | to B. | 1 wt. net | | 926 | to B. |
| 11 | 1240 " | 66 | " C. | 1 | " | 958 | " C. |
| 11 | 1173 " | 65 | " D. | 1 | " | 899 | " D. |
| 11 | 1163 " | 54 | " E. | 1 | " | 965 | " E. |

Required the balance on their respective accounts.

| | | | |
|---|---|---|---|
| Ans. There is due to D. | $25,32 | Due from B. | $25,86 |
| " " E. | 9,18 | " " C. | 8,64 |
| | $34,50 | | $34,50 |

* The 12 hhds. wanted 72 gallons of being full.

14. A supercargo invested certain sales in purchasing 1425 bushels of Corn in a suothern port, of which

| | | | |
|---|---|---|---|
| A's sales purchased | | 630 | bushels. |
| B's | " | 342 | " |
| C's | " | 216 | " |
| D's | " | 105 | " |
| E's | " | 132 | " |

At his return to ——, the owners doubting whether the measure would hold out, agreed that each should take at his option, and adjust for excess or deficiency of his share at 50 cents per bushel,

| | | | |
|---|---|---|---|
| When A. took | | 600 | bushels. |
| B. | " | 300 | " |
| C. | " | 200 | " |
| D. | " | 90 | " |
| E. | " | 100 | " |

And 59 bushels remaining were sold by the supercargo for $29,50 in Cash. Required the result of his *statement* to the owners.

Ans. $11,88 due to B.
2,24 " C.
4,70 " D. | $1,80 due from A.
12,48 " E. | 29,50 in Cash.

$31,30 $31,30

15. The amount of Invoice of the Cargo of the Schooner Caroline, A. B. Master, for the West Indies, on account and risk of C. D. of B. was $2216,41, and the gross sales at Port-au-Prince were, viz.

| | | |
|---|---|---|
| 96 barrels Mackerel | - - | at $5,50 |
| 50 boxes Fish | - - - - | 2,50 |
| 15 barrels Clear Pork | - - | 20,00 |
| 123 boxes Soap | - - - | 1,75 |
| 117 barrels Flour | - - - | 13,00 |
| 2 do. Alewives | - - - | 5,50 |
| 5 do. do. | - - - | 5,00 |
| 24 kegs Lard Tare $\frac{794}{119}$ | 675 lbs. - | ,13 |
| 12 barrels No. 1 Pork | - - | 15,00 |
| 1 do. do. do. | - - | 15,00 |
| 29 boxes Tobacco, 3501 lbs. | - | 20,00 per ct. |
| 2 do. do. 254 lbs. | - | 18,00 per ct. |

*Charges.*

Paid for Duties, Wharfage, Cooperage, Hospital tax, &c. $672,07.

The Commission on the Sales was at 5 per cent.

*Cost of the Return Cargo, viz.*

160 bags of Coffee, weighing 22464 lbs. tare 160 lbs. at $10,37½ per cent.

*Charges.*

Duty $20 per 1000 lbs. W'g and Wharfage $1 per 1000 lbs. Paid for bags at 30 cts. per 100 lbs. Permits, Drayage, &c. $44,61. Commission on the whole at 2½ per cent.

Required the advance made on the outward cargo, also the balance on Capt B's *stating his account* at Port-au-Prince with his owner, and in whose favour.

Ans. $677,74 Advance.
72,14 Due to Capt. B.

16. G. H. received per Brig Mentor, Capt. B. on consignment from L. M. of Havana, ten hhds. of Molasses, which were sold per order for cash. Sales, &c. viz.

| | Gals. | Wants. | | Gals. | Wants. |
|---|---|---|---|---|---|
| Gauges, No. 1. | 112 | 15 | No. 6. | 103 | 14 |
| 2. | 100 | 9 | 7. | 107 | 11 |
| 3. | 98 | 7 | 8. | 99 | 9 |
| 4. | 101 | 10 | 9. | 111 | 15 |
| 5. | 106 | 11 | 10. | 98 | 10 |
| | 517 | 52 | | 518 | 59 |
| | 518 | 59 | | | |

Gauges
Wants

No. galls. at 30 cents.

*Charges.*

Freight $30, Wharfage $1, Labour 90 cts. Advertising 75 cts. Auction charges $1,50, Duties 5 cts. per gallon, Commission on sales at 2½ per ct. Required the Net proceeds as stated in the *Account of Sales*, forwarded to L. M. of Havana. Ans. $189,92.

17. A. owned $\frac{7}{24}$, B. $\frac{3}{24}$, C. $\frac{8}{24}$, and D. $\frac{6}{24}$, of the Ship Caroline. A. acted as agent in the outfitting of the ship for Havana, towards which B's bill was $720, C's $1920, and D's $1440. Some days after her departure, A. became bankrupt, and it appeared that there was still due to the creditors of the ship and cargo, $7413,84. At a meeting of the owners, C. was appointed to apportion the shares for the deficiency, and also to subdivide the bankrupt's part on them which they are to make good in consequence of his failure. On C's exhibiting his *statement*, a settlement was made by payments in cash. How much did each pay?

Ans. B. paid $1308 12
C. " 3488 37
D. " 2616 35
$7413 84

18. The Brig Susan, employed in the Flour trade, was owned equally by Charles Clinton, of Baltimore, and Richard Payson of Boston, who, as agent, sold $\frac{1}{8}$ of her to Capt. Hilton for cash, engaging to freight his part at 50 cents per barrel, gave him 3 per cent. privilege and $25 per month as master of her. In this business he made three voyages from Boston to Baltimore, delivering at each time 1000 barrels in Boston. His share of passage money was

On the first voyage $10,20 out, and $8,40 home.
" second " 9,40 " 7,00 "
" third " 16,60 " 8,40 "

At the end of five months it appeared by Richard Payson's account, that the disbursements for the brig amounted to $696,96. The premium of Insurance, effected by him for Capt. Hilton was $20. The small stores remaining on board were sold for $50,24. On settlement the balance in his favour was paid to him in cash, and he was furnished with a copy of the *Brig's Account*, and of his *own* with the owners. The amount paid Capt. Hilton is required.

Ans. $311,63

19. A. B. and C. agree to build a factory, to be concerned each one third. A. to be agent at $1000 per annum, to be paid quarterly. At commencing, each of them pays $1000.

| | | | | | |
|---|---|---|---|---|---|
| In | 3 | months | A. | pays | $500 |
| " | 4 | " | C. | " | 610 |
| " | 6 | " | B. | " | 725 |
| " | 7 | " | C. | " | 1200 |
| " | 9 | " | B. | " | 1675 |
| " | 12 | " | A. | " | 1630 |
| " | 14 | " | B. | " | 2115 |
| " | 17 | " | A. | " | 505 |
| " | 24 | " | C. | " | 2983 |

At which time the factory is completed. By agreement, interest is to be allowed on the several advances, and as the Agent received nothing for his services during the time, the instalments of his salary are to be considered as advances on his part as they became due. Required the balances as exhibited by the Treasurer's *statement*.

Ans. $64,13$\frac{1}{3}$ due to C.
16,10$\frac{5}{6}$ " " A.
80,24$\frac{1}{6}$ due from B.

20. A. B. and C. are jointly concerned in trade. At commencing, A. advances $1500, B. $2100, and C. $3000. On balancing their books at the end of 12 months, their net stock amounted to $8850. A. stands indebted to the company on his private account $300, and B. 180, and C. is creditor for $480. By their contract, they are allowed interest for their unequal advances of stock, at 6 per cent. and then share the gain equally. Required the share of each in the present stock, as exhibited in their *respective accounts* by the managing partner.

Ans. A. owns $1908
B. " 2664
C. " 4278

$8850 whole stock.

21. Three persons, A. B. and C. agreed to trade in Company with a joint stock of $8957. A's share is $\frac{6}{13}$, B's $\frac{4}{13}$, and C's $\frac{3}{13}$. At the end of a year when they balanced their books, there appeared a loss of $1157. C. being discouraged at the prospect, desires to withdraw from the concern, and the other partners propose to take the risk of recovering the outstanding debts, and pay him his share in the pres-

ent stock, on being allowed a discount of 17½ per cent. to which C. consents, and he is paid accordingly.—Required the result of this concern, as shown by the *company's books* at closing.

Ans. A. now owns $\frac{3}{5}$, valued at $4491
B. " $\frac{2}{5}$, " 2994
C. receives for his part 1485

22. *Estimate* of a voyage for the Ship Washington, from Boston to Batavia, viz.

Suppose the ship and appurtenances to be worth $16000; outfits $2600; specie in dollars $136500; premium on them to be 2 per cent.; interest on capital for 16 months at 6 per cent. per annum; coffee to be at $21 per picul in Batavia, and Specie at par, and the whole invested. The disbursements there amounting to $2300, being paid out of the owner's funds in Batavia. Supposing each picul to weigh in the United States 130 lb. and to sell at 22 cents per lb. and the ship to be valued at $14000 on her return, what would it leave for expenses and profit? Ans. $20785,60.

23. *Estimate* of a voyage of the Ship Clinton of New-York, from Amsterdam to Batavia, and back to Amsterdam, viz.

Capital invested in guilders and merchandize $80000, to yield a gain of 12½ per cent. in Batavia, which sum, besides discharging $1300 for disbursements there, would purchase 3700 piculs of coffee at $23 per picul, and 600 piculs of sugar at $6 per picul. Supposing the coffee to sell in Amsterdam at $30, and the sugar at $9 per picul, what would be the gain, allowing 7 per cent. for interest, and 5 per cent. for insurance, and $9000 for all expenses and wear of the ship for 12 months. Ans. $17800.

## MERCANTILE PRECEDENTS.

### *BILL OF EXCHANGE.*

*Newburyport, Feb.* 12, 1804.

EXCHANGE for £1000 sterling.

At twenty days sight of this my first of Exchange, (second and third of the same tenor and date not paid) pay to John Parker, or order, One Thousand Pounds Sterling, with or without further advice from

Your humble Servant,

WILLIAM PRINCE.

Messrs. Dutton & Green,
Merchants,
London.

### *PROMISSORY NOTE.*

*Boston, May* 5, 1804. For value received, I promise to pay to Simon Simmonds, or order, seventy-eight dollars forty-eight cents, on demand, with interest after two months.

Attest, William Poole.
Saul James.

### *A RECEIPT FOR AN ENDORSEMENT ON A NOTE.*

*Boston, July* 12, 1804. Received from Mr. William Poole, (by the hands of Mr. Benjamin Flint,) thirty-eight dollars seventy cents, which is indorsed on his note dated March 5, 1804, for fifty dollars, and payable to me on demand.

Simon Simmonds.

$38 70 cts.

### *RECEIPT FOR MONEY RECEIVED ON ACCOUNT.*

*Boston, January* 10, 1804. Received from Mr. D. Evans, (by the hands of Mr. Thomas Dunmore,) Four hundred and thirty dollars on account *

$430 George Page.

* When bills or receipts are lost or mislaid, and others of the same tenor and date are required, they should be marked *duplicates*, to prevent misunderstanding.

## *PROMISSORY NOTE BY TWO PERSONS.*

*Newburyport, 12th July*, 1804. For value received, we jointly and severally promise to pay to Mr. Samuel Rich, or order, Five hundred dollars fifty-four cents, on demand, with interest.

Attest, NATHAN SAYBORN.
WILLIAM BOLTON. STEPHEN NEEDY.

——, *November* 15, 1827.

For value received, we the subscribers, A. B. as principal, and C. D. and E. F. as sureties, promise jointly and severally to pay to G. H. or order, Five dollars, in sixty-three days, with interest after.

A. B.
C. D.
E. F.

---

## *GENERAL RECEIPT.*

*New-Bedford, March* 27, 1804. Received from Mr. N. B. the sum of Ten dollars twenty-nine cents, in full of all demands.

$10 29 E. D.

---

## *BANK NOTES.*

When a note is offered at a bank for discount, two endorsers are generally required, to the first of whom it is said to be payable: Thus A. having occasion for a sum of money, procures B. and C. as endorsers to his note, and offers it for discount in the following form:

$100 ——, ——.

For value received, I promise to pay B. or order, at the —— Bank, on demand, one hundred dollars, with interest after —— days.

A.

When state notes, bank shares, &c. are lodged in a bank as security for moneys, a note is presented in this form:

For value received, I promise to pay the President, Directors and Company of the —— Bank, or their order, at said Bank, on demand, —— dollars, with interest after —— *days.*

C. D.

## ACCOUNTS OF SALES.

***SALES** of 20 hhds. 7 bbls. and 31 bags Coffee, for and on risk of Mr. William Stillman, merchant in Portland.*

1804.

| | | | |
|---|---|---|---|
| March 15, | William Edes, 20 hhds. wt. 14376 lb. at 23 cts. per lb. | $3306 | |
| 16, | George Watts, 7 bbls. wt. 1493 at 23 cts. | 343 | 39 |
| 17, | Peter Bates, 31 bags, " 5507 " 23 " | 1266 | 61 |
| | | 4916 | 48 |
| *Charges,* | | | |
| | Advertising, - - - - - | $1 46 | |
| | Storage, - - - - - - | 3 50 | |
| | Commission on $4916,48 cts. at 2½ per cent. | 122 91 | |
| | | 127 | 87 |
| | Net proceeds passed to his credit, | $4788 | 61 |

Errors excepted, &c.

***SALES** of sundry merchandize received per the ship Juno, Capt. Dane, from Machias, and disposed of for account and risk of Amos Goodwin, merchant there.*

| Date. | To whom sold. | Qtls. Fish. | Barrels Oil. | Bbls. Salmon. | bbls. Herring. | Cords Wood. | Cords Bark. | Feet Boards. | Bbls. Beef. | Price. | Amount. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1824. | | | | | | | | | | $ cts. | $ cts. |
| June 4 | James Yates | 30 | | | | | | | | 3 | 90 |
| 8 | Wm. Rowe | 120 | | | | | | | | 3 27 | 292 40 |
| 27 | John Payson | | 6 | | | | | | | 12 | 72 |
| July 4 | James Nugent | | | | | | 22 | | | 4 | 88 |
| – | Cash | | | 50 | | | | | | 8 75 | 437 50 |
| 8 | Sim. Sands | | | | | | | 3,216 | | 6 50 | 20 90 |
| 21 | Stock | | | | | | | | 15 | 9 | 135 |
| 29 | Paul Simson | | | | | 13 | | | | 3 50 | 45 50 |
| Aug. 5 | Jona. Rose | | | | | | | 1,259 | | 6 | 7 55 |
| | Taken to fill up | | 1 | | | | | | | | |
| | | 150 | 7 | 50 | | 13 | 22 | 4,475 | 15 | | 1288 85 |

Remaining unsold, 40 barrels of herring.

*Charges, viz.*

| | | |
|---|---|---|
| Storage of Fish - - - - - | $10 50 | |
| Commission on $1288,85 cts. at 2½ per cent. - - | 32 22 | |
| | 42 | 72 |
| Net proceeds carried to the credit of his account, | $1246 | 13 |

Errors excepted, &c.

*SALES of 19 hogsheads and 7 bbls. of Wine received per the schooner Ruby, Richard Butler, master, from Portsmouth, for account and risk of Daniel Edwards, merchant there.*

| *Date.* | *To whom sold.* | *19 hhds. Wine.* | *7 bbls. Wine.* | *Gallons.* | *Price.* | *Contents.* | *Amount.* |
|---|---|---|---|---|---|---|---|
| 1804. | | | | | *cts.* | | $ *cts.* |
| May 24 | By Walter King | | 1 | 29½ | 100 | | 29 50 |
| June 2 | By David Jones | 2 | | 216 | 100 | 110 and 106 | 216 |
| 20 | By James Ray | 4 | | 438 | 96 | 108, 110, 111, 109 | 420 48 |
| 24 | By Aaron Judson | | 3 | 81 | 95 | 26½, 27½, 27 | 76 95 |
| July 23 | By Tho's. Ropes | 1 | | 115 | 95½ | | 109 32 |
| Aug. 3 | By Parsons & Ely | | 1 | 25 | 95½ | | 23 87 |
| 23 | By Simon Sands | 2 | | 222 | 98 | 109, 113 | 217 56 |
| Sept. 4 | By Miles Young | 1 | 1 | 138 | 96 | 110, 28 | 132 48 |
| 10 | By Moses Bliss | 3 | 1 | 342½ | 99 | 107, 104, 103, 28½ | 339 7 |
| 25 | By Amos Dundas | 6 | | 632 | 98½ | 109, 102, 106 / 111, 112, 92 | 622 52 |
| | | 19 | 7 | 2299 | | | 2188 25 |

*Charges.*

| | | |
|---|---|---|
| Paid Capt. Butler freight of 19 hhds. Wine at - - - - - $2,50 | $47 | 50 |
| ditto 7 bbls. 66 | 4 | 62 |
| Porterage 19 hhds. - - 40 | 7 | 60 |
| ditto 7 bbls. - - 10 | | 70 |
| Gauging 26 casks - - 12½ | 3 | 25 |
| Cooperage $3 on hhds. $1,50 on bbls. | 4 | 50 |
| Advertising - - - - - - - - | 1 | 25 |
| Commission on $21188,25 at 5 per cent. | 109 | 41 |
| | 178 | 83 |
| Net proceeds, | $2009 | 42 |

Outstanding in the hands of Moses Bliss $339 7
" " Amos Dundas 622 52

*Boston 25th September*, 1804.

Errors excepted, &c.

*Dr.* *Mr. John Johnson in account current with William Roberts.* *Cr.*

| 1803. | | $ | cts. |
|---|---|---|---|
| May 19. | To cash advanced per receipt - - | 300 | |
| June 5. | To sundries per bill - - - | 458 | 12 |
| July 25. | To payment of his order to M. B. for - | 100 | |
| 29. | To 1 bag coffee 96 lb. at 20 cents - | 19 | 20 |
| Aug. 1. | To cash per receipt - - - - | 450 | |
| – | To 5 hhds. wine 555 gals. at 83⅓ cts. | 462 | 50 |
| – | To 3 boxes glass 7 by 9, at $10 - - | 30 | |
| Sept. 2. | To sundries per bill - - - | 228 | 56 |
| – | To cash per receipt - - - - | 385 | |
| 20. | To 12 bbls. flour at $8, 4 bbls. pork at $12 | 144 | |
| 25. | To 1 hhd. sugar 8 cwt. 2 qrs. 7 lb. at $10 | 35 | 62 |
| Oct. 9. | To cash and sundries in full - - | 81 | |
| | | $2744 | |

| 1803. | | $ | cts. |
|---|---|---|---|
| Oct. 28. | By ship Columbia for hull thereof complete, being 171½ tons, at $16 | 2744 | |
| | | $2744 | |

Salem, Oct. 28, 1803.
Errors excepted,
WILLIAM ROBERTS

*Dr.* *Mr. James Richardson in account current with Thomas Seccome.* *Cr.*

| 1803. | | $ cts. |
|---|---|---|
| June 12. | To sundries per bill - - - - - | 28 26 |
| | To 53 bars Iron, wt. 21 2 10 for schooner William. | |
| July 15. | To 121 do. 41 2 18 do. do. | |
| 26. | To 1 hhd. Wine, qt. 107 gals. at 96 cts. | 102 72 |
| Aug. 28. | To Cash per receipt - - - - | 180 00 |
| 29. | To 4 bbls. Flour at $9,50 cts. - - | 38 00 |
| Sept. 21. | To Cash paid his order to James Wise | 28 00 |
| | To Cash in full - - - - - | 2 52 |
| | | $379 50 |

| 1803. | | $ cts. |
|---|---|---|
| Oct. 12. | By schooner William for blacksmith's work per bill, viz. 6325 lb. at 6 cts. | 379 50 |
| | 759 lb. tare at 12 —— per cent. | |
| | 7084 lb. supplied per Dr. | |
| | | $379 50 |

NOTE. When a person is furnished with his account current, it is necessary to specify the various charges, and when they are numerous, some accountants make but one charge of them in the account current, referring to an annexed account of the several articles thus included.

Newburyport, 12th Oct. 1803.
Errors excepted,
THOMAS SECCOME.

*An Interest Account in Sterling.*

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| August 13. | To | £2648 | 10 | 0 | for | 140 | days | - | - | - | - | - | - | Products 370860 |
| Septem. 18. | To | 18 | 1 | 0 | " | 104 | " | - | - | - | - | - | - | " 1872 |
| October 2. | To | 31 | 19 | 7 | " | 90 | " | - | - | - | - | - | - | " 2880 |
| " 26. | To | 246 | 17 | 6 | " | 66 | " | - | - | - | - | - | - | " 16302 |
| Novem. 16. | To | 33 | 0 | 0 | " | 45 | " | - | - | - | - | - | - | " 1485 |
| | | | | | | | | | | | | | | 393399 |
| August 31. | By | £8 | 0 | 0 | for | 122 | days | - | - | - | - | - | Products | 976 |
| October 5. | By | 45 | 3 | 9 | " | 87 | " | - | - | - | - | - | " | 3915 |
| Novem. 10. | By | 305 | 10 | 10 | " | 51 | " | - | - | - | - | - | " | 15606 |
| Decem. 11. | By | 2496 | 9 | 11 | " | 20 | " | - | - | - | - | - | " | 48720 |
| | | | | | | | | | | | | | | 69217 |
| | | | | | | | | | | | | | Balance of products | 324182 |

Drs. 393399
Crs. 69217

7300)324 82

£44 8 2 Balance of Interest at 5 per cent.
227 11 9 ditto Principal.

*Liverpool, Dec. 31st, 1827.*

*Sales by Auction of 2 bales Woollens, received from Liverpool by the ship John Adams, John Biddle, Esq. commander, on account of William Sutton, of Leith.*

| | | | No. | Yards. | | $ cts. | $ cts. | $ cts |
|---|---|---|---|---|---|---|---|---|
| Sept. 7 | 1 piece Cloth, | | 1 | 13 | at | 2 33 | 30 29 | |
| at 3 m's | 1 - - | | 2 | 25¾ | | 2 00 | 51 50 | |
| W & B | 1 - - | | 3 | 23 | | 2 00 | 46 60 | |
| | 1 - - | | 4 | 21¾ | | 2 17 | 47 19 | |
| 1 a 10 | 1 - - | | 5 | 23¾ | | 2 79 | 66 25 | |
| | 1 - - | | 6 | 22 | | 2 12 | 46 64 | |
| | 1 - - | | 7 | 19 | | 3 00 | 57 00 | |
| | 1 - - | | 8 | 24 | | 2 41 | 53 04 | |
| | 1 - - | | 9 | 21 | | 3 17 | 66 57 | |
| | 1 - - | | 10 | 24 | | 3 04 | 72 96 | |
| | | | | | | | | 537 44 |
| | | | No. | Yards. | | $ cts. | | |
| | 2 ps. Cassimere, | | 11 12 | 55½ | at | 1 | 55 50 | |
| 14th | 2 - - - | | 13 14 | 54½ | | 99 | 53 96 | |
| at 3 m's | 2 - - - | | 15 16 | 56 | | 94 | 52 64 | |
| | 2 - - - | | 17 18 | 52 | | 94 | 48 88 | |
| | 2 - - - | | 19 20 | 54 | | 94 | 50 76 | |
| | 2 - - - | | 21 22 | 49¾ | | 1 25 | 62 19 | |
| | 2 - - - | | 23 24 | 53 | | 1 21 | 64 13 | |
| | 2 - - - | | 25 26 | 47½ | | 1 21 | 57 47 | |
| | 2 - - - | | 27 28 | 49¾ | | 1 21 | 60 20 | |
| | 2 - - - | | 29 30 | 46 | | 1 21 | 55 66 | |
| | | | | | | | | 561 39 |
| | | | | | | | | 1098 83 |
| | *Charges.* | | | | | | | |
| | Paid freight and primage - - - | | | | | | 7 44 | |
| | U. S. impost - - - - - - | | | | | | 139 14 | |
| | Advertising and crying - - | | | | | | 2 00 | |
| | Bond and permit - - - - | | | | | | 1 40 | |
| | Wharfage 27 cts. truckage 48 c. | | | | | | 75 | |
| | Commis. interest and guar. on $1098,83 at 5 per cent. | | | | | | 54 94 | |
| | | | | | | | | 205 67 |
| | | | | | | Net proceeds, | | 893 16 |

*Boston, Sept. 21st.*

*Invoice of 40 Bales Cotton, shipped by Samuel Wright on board brig Industry, David King master, bound for Liverpool, for sole account and risk of James Wood, merchant of Boston, and consigned by his order to Messrs. Wright and Sons, merchants, Liverpool.*

| | | | | | |
|---|---|---|---|---|---|
| T | 30 bales prime N. Orleans Cotton | | | | |
| 1 ad. 30. | No. 1 - 300 | No. 16 - 304 | | | |
| | 2 - 293 | 17 - 308 | | | |
| | 3 - 287 | 18 - 298 | | | |
| | 4 - 306 | 19 - 279 | | | |
| | 5 - 308 | 20 - 288 | | | |
| | 6 - 389 | 21 - 298 | | | |
| | 7 - 304 | 22 - 299 | | | |
| | 8 - 301 | 23 - 297 | | | |
| | 9 - 305 | 24 - 309 | | | |
| | 10 - 295 | 25 - 307 | | | |
| | 11 - 284 | 26 - 297 | | | |
| | 12 - 278 | 27 - 284 | | | |
| | 13 - 310 | 28 - 282 | | | |
| | 14 - 315 | 29 - 276 | | | |
| | 15 - 309 | 30 - 301 | | | |
| | 4484 | 4427 | | | |
| | 4427 | | | | |
| | 8911 | | | | |
| | Draft ½ p. ct. 45 | 8866 lb. at 18 cts. | | 1595 88 | |
| D | 10 bales ditto ditto. | | | | |
| 1 *a* 10. | No. 1 - 308 | No. 6 - 301 | | | |
| | 2 - 307 | 7 - 310 | | | |
| | 3 - 310 | 8 - 318 | | | |
| | 4 - 320 | 9 - 315 | | | |
| | 5 - 310 | 10 - 318 | | | |
| | 1555 | 1562 | | | |
| | 1562 | | | | |
| | 3117 | | | | |
| | Draft ½ p. ct. 16 | 3101 lb. at 17 cts. | | 527 17 | |
| | *Charges.* | | | | 2123 05 |
| | Draying $6, wharfage $4, mending $2, | | | 12 00 | |
| | Commission 2 1-2 per cent. on $2123 05 | | | 53 07 | |
| | *New Orleans, April 25th, 1823.* | | | | 65 07 |
| | Errors excepted. | | | | 2188 12 |
| | S. WRIGHT. | | | | |

## *Freight List of Brig Harmony, William Race, from Boston to New Orleans.*

| Marks and numbers. | Packages and Contents. | By whom Shipped. | To whom Consigned. | Weight or Measure. | Rate of Freight. | Amount. |
|---|---|---|---|---|---|---|
| W S | 15 casks Cheese | W S | G K | tons ft. in. | per cask | $1,00 | $15 00 |
| 1 ad. 15 | 6 trunks Shoes | &c. | &c. | 1 3 8 | per ton | 8, | 8 73 |
| &c. | 26 boxes Sperm Candles | | | tons cwt. qrs. lbs. | per box | ,20 | 5 20 |
| | 250 casks Nails | | | 22 19 0 25 | per ton | 6, | 137 77 |
| | 10 rolls Carpeting | | | | whole | 10, | 10 00 |
| | 1 hogshead Bacon | | | | whole | 4, | 4 00 |
| | 3 boxes Calcutta Goods | | | 37 ft. 8 in. | per ton | 8, | 7 52 |
| | 1 box of Books | | | 12 0 | per ton | 8, | 2 40 |
| | 1 case Saddles and Bridles | | | 20 8 | per ton | 8, | 4 13 |
| | 13 pipes Gin | | | | per pipe | 4, | 52 00 |
| | 45 boxes Glass | | | ton. cwt. qr. lb. | per box | ,20 | 9 00 |
| | 10 bundles English Nail Rods | | | 15 7 1 21 | per ton | 7, | 107 60 |
| | 9 bundles German Steel | | | | | | |
| | 100 boxes Raisins | | | | per box | ,14 | 14 00 |
| | 20 kegs Salmon, 3 do. Pickles | | | | per keg | ,04 | 2 12 |
| | 24 sets Sugar Boxes | | | | per set | ,05 | |
| | 1 trunk Paper | | | 27 ft. 4 in. | per ton | 8, | 5 47 |
| | 40 coils Rigging | | | | whole | 12, | 12 00 |
| | 30 boxes Soap | | | | per box | ,20 | 6 00 |
| | 40 boxes Madeira Wine | | | | per box | ,60 | 24 00 |

| | | | | | |
|---|---|---|---|---|---|
| 45 kegs Butter | | whole | 7, | | |
| 50 boxes Sperm Candles | | per box | ,20 | | |
| 15 casks Linseed Oil | | per cask | 1,25 | 73 | 75 |
| 5 bbls. Hake Oil, 33 ditto Whale Oil | | per bbl. | 1, | | |
| 2 cases black Silk Hdk'fs | 5 ft | per ton | 8, | 1 | 00 |
| 57 trunks and 6 boxes Merchandize | | whole | 38, | 38 | 00 |
| 1 box Looking Glasses | | | | | |
| 32 bbls. Mackerel | | per bbl. | 1, | 32 | 00 |
| 1 case containing Piana Forte | | case | 4, | 4 | 00 |
| 78 coils Rigging and 5 dozen Hand Lines | cwt. qrs. lb. 17 3 7 | per ton | 8, | 7 | 12 |
| 51 kegs Tongues and Sounds, 49 kegs Salmon | | per keg | ,05 | 19 | 00 |
| 14 casks Cheese | ton. ft. in. 1 35 8 | per cask | 1, | | |
| 2 boxes Furniture | | per ton | 8, | 15 | 13 |
| 7 trunks Shoes | 24 6 | per ton | 8, | 4 | 90 |
| 7 boxes Furniture | 3 3 7 | per ton | 8, | 24 | 72 |
| 1 Long Boat | | whole | 10, | 10 | 00 |
| | | | | $ | |

8 Passengers on board the brig at $36, each

*Freight List of the Brig Volant, Capt. Samson, from Boston to Charleston, S. C.*

| *Shippers.* | *Consignees.* | *Articles.* | *Marks.* | *Rate.* | *Amount.* |
|---|---|---|---|---|---|
| E N M &c. | D E &c. | 30 bbls. Beef | W I ad 30 &c. | 45 cts. each | $13 50 |
| | | 15 hhds. } N. E. Rum | | hhd. $1,75 } | 35 25 |
| | | 20 bbls. } | | bbls. ,45 } | |
| | | 13 boxes candles | | 21 2-3 feet *a* 12 1-2 cents | 2 71 |
| | | 3 casks and 3 cases Hardware | | whole $5,75 | 5 75 |
| | | 1 box Domestic Goods | | 9 1-2 feet *a* 12 1-2 cents | 1 19 |
| | | 100 half bbls. Beef | | at 25 cents each | 25 00 |
| | | 8 trunks Shoes | | 26 3-4 feet *a* 12 1-2 cents | 3 35 |
| | | 2 bbls. Shoes | | at 50 cents each | 1 00 |
| | | 15 bbls. Beef | | 50 cents each } | 12 50 |
| | | 20 half bbls. Beef | | 25 cents each } | |
| | | 50 half bbls. do. | | 25 cents each } | 22 00 |
| | | 190 boxes Herrings | | 5 cents each } | |
| | | 1 box Shoes | | 4 1-4 feet *a* 12 1-2 cents | 53 |
| | | 3 boxes Shoes | | 37 1-4 ft. *a* 12 1-2 cts. } | 6 54 |
| | | 2 boxes Hats | | at 6 1-4 cents } | |
| | | 30 boxes Herring | | 138 feet at 10 cents | 13 80 |
| | | 100 boxes Candles | | 14c. 0 21 at $5 per ton } | |
| | | 240 pieces Cast Iron Ware | | at 10 cents } | 10 50 |
| | | 46 bundles Shovels, Spades, &c. | | 18 3-4 ft. at 12 1-2 cents | |
| | | 1 case } | | 3 cents each } | |
| | | 1 bundle } | | 66 feet at 10 cents } | 16 20 |
| | | 3 boxes } | | at 12 1-2 cents } | |
| | | 120 Griddles | | 6 6-14 tons per ton $3 | 19 28 |
| | | 20 boxes Chocolate | | | |
| | | 1 box Merchandize | | | |
| | | 48 bundles Spades | | | |
| | | 26 hammered Stones | | | |

| | | | |
|---|---|---|---|
| 30 bbls. Bread | | | |
| 1 pair Guns with carriages | | | |
| 56 iron Shot, 30 lb. Grape | | | |
| 6 muskets, 10 bolts Russia and 10 bolts Ravens Duck, 2 boxes Tea, 14 coils Cordage, 35 bbls. Beef | | | |
| 1 Anchor and Stock, 1 keg lamp Oil | Columbus of Boston. | | |
| 14 bbls Rum | | | |
| 1780 feet in 79 pieces Plank and Boards | | | |
| 1 Bed and Bedding | | | |
| 1 Portable Desk | | | |
| 1 Top Mast, 4 small Spars | | | |
| 11 coils Cordage | | 49 cents | 12 00 |
| 30 bundles Hay—6 tons | | | 44 33 |
| 12 Spars | | 1 ton at $3,50 | 3 50 |
| 11 Poles | | at $6 | |
| 5600 feet Boards | | 2 each | |
| 400 inches Spars | | 1s. " | 117 83 |
| 7 boxes Hats | | $5 | |
| 20 casks Raisins | | 7 cents | |
| 20 boxes Figs | | 82 1-4 feet at 9d. | 10 31 |
| 15 casks Cheese | | 25 cents each | 10 00 |
| 155 reams Paper | | 87 1-2 cents each | 5 63 |
| 8 boxes and 1 trunk Shoes | | 5 cents | 7 75 |
| 3 cases Silk and 2 do. Cottons | | 21 1-2 feet a 12 1-2 cents | 2 70 |
| 40 boxes Soap | | 15 1-3 feet at 10 cents | 1 53 |
| 11 boxes Weights and Scales | | 5 cents | 2 00 |
| | | whole | 4 50 |
| | | | $ |

## *BILL OF SALE.*

To all people to whom this present Bill of Sale shall come, I, R. P. of Newburyport, in the State of Massachusetts, Merchant, send Greeting; KNOW YE, that I the said R. P. for and in consideration of the sum of *three thousand two hundred and twenty-two dollars*, to me in hand well and truly paid at or before the ensealing and delivery of these presents, by S. T. of the said Newburyport, Merchant, the receipt whereof I do hereby acknowledge and am therewith fully and entirely satisfied and contented, have granted, bargained and sold, and by these presents do grant, bargain and sell, unto the said S. T. all the hull or body of the good brig Sally, together with all and singular her masts, spars, sails, rigging, cables, anchors, boats and appurtenances, now lying at Newburyport, and registered at the port of Newburyport, the certificate of whose registry is as follows:

*IN pursuance of an Act of the Congress of the United States of America, entitled "An ACT concerning the registering and recording of ships or vessels," R. P. of Newburyport in the State of Massachusetts, Merchant, having taken or subscribed the oath required by the said act, and having sworn that he is the only owner of the ship or vessel called the Sally of Newburyport, whereof William Knapp is at present master, and is a citizen of the United States, as he hath sworn, and that the said ship or vessel was built at Salisbury, in the said State in the year seventeen hundred and ninety-nine, as also appears by a certificate of enrolment, No. 129, issued in this district on the fourth day of August last now surrendered—and N. S. Surveyor of this district having certified that the said ship or vessel has one deck and two masts, and that her length is sixty-nine feet five inches, her breadth twenty-two feet and one half inch, her depth eight feet two inches, and that she measures one hundred and six tons and forty ninety-fifths, that she is a square sterned brig, has no galleries and no figure head, and the said R. P. having agreed to the description and admeasurement above specified, and sufficient security having been given according to the said act, the said brig has been duly registered at the port of Newburyport.*

*Given under my hand and seal at the port of Newburyport, this first day of January, in the year one thousand eight hundred.*

To have and to hold the said granted and bargained brig Sally and premises with the appurtenances, unto the said S. T. his heirs, executors, administrators or assigns to his only proper use, benefit and behoof forever. And I the said R. P. do avouch myself to be the true and lawful owner of the said brig and appurtenances, and have in myself full power, good right and lawful authority to dispose of the said brig as aforesaid, and her appurtenances in manner as aforesaid, and furthermore, I the said R. P. do hereby covenant and agree to warrant and defend the said brig and premises, with the appurtenances, against the lawful claims and demands of all persons whatsoever unto the said S. T. In witness whereof, I the said R. P. have hereunto set my hand and seal, this tenth day of June, in the year of our Lord one thousand eight hundred.

---

## *CHARTER PARTY.*

This Charter-party of affreightment, indented, made and fully concluded upon this ninth day of June, in the year of our Lord one thousand eight hundred, between J. P. of Boston, in the county of Suffolk, and Commonwealth of Massachusetts, merchant, owner of the good ship Helen, of the burden of two hundred tons, or thereabouts, now lying in the harbor of Boston, whereof R. P. is at present master, on the one part, and C. D. of said Boston, merchant, on the other part, *Witnesseth*, That the said J. P. for the consideration hereafter mentioned, hath letten to freight the aforesaid ship, with the appurtenances to her belonging, for a voyage to be made by the said ship to London, where she is to be discharged (the dangers of the sea excepted) and the said J. P. doth by these presents covenant and agree with the said C. D. in manner following, *That is to say*, That the said ship in and during the voyage aforesaid, shall be tight, staunch and strong, and sufficiently tackled apparelled with all things necessary for such a vessel and voyage ; and that it shall and may be lawful for the said C. D. his agents or factors, as well at London as at Boston, to load and put on board the said ship, loading of such goods and merchandize as they shall think proper, contraband goods excepted:

In consideration whereof, the said C. D. doth by these presents, agree with the said J. P. well and truly to pay, or cause to be paid unto him, in full for the freight or hire of said ship and appertenances, the sum of three dollars per ton per calendar month, and so in proportion for a less time, as the said ship shall be continued in the aforesaid service, in sixty days after her return to Boston. And the said C. D. doth agree to pay the charge of victualling and manning said ship, and all port charges and pilotage during said voyage, and to deliver the said ship on her return to Boston, to the owner aforesaid or his order. And to the true and faithful performance of all and singular the covenants, payments and agreements aforementioned, each of the parties aforenamed binds and obliges himself, his executors and administrators, in the penal sum of two thousand dollars firmly by these presents. In witness whereof, the parties aforesaid have hereunto interchangeably set their hands and seals the day and year afore-written.

## *BILL OF LADING.*

J. R.
1 *a* 53
*Casks Potash.*
*ton. cwt.*
8 18 £ *s. d.*
*at* 80*s.* 35 12 0
*Primage*
*pr. ct.* 1 1 15 7
£37 7 7

SHIPPED in good order and well conditioned by John Rolly, in and upon the good ship called the Iris, whereof is master for this present voyage, Charles Ely, and now riding at anchor in the harbour of Newport, and bound for Liverpool, to say, *fifty-three casks of potash containing eight tons and eighteen cwt.* being marked and numbered as in the margin, and are to be delivered in the like good order, and well conditioned, at the aforesaid port of Liverpool (the danger of the seas excepted) unto Mr. J. May or to his assigns, they paying freight for the said goods, *four pounds* British sterling *per ton*, with five per cent. primage. In witness whereof, the master or purser of the said ship hath affirmed to three bills of lading, all of this tenor and date, the one of which being accomplished the other two to stand void. Dated in Newport, July 7th, 1827. C. ELY.

## *DIRECTIONS TO SHIP MASTERS.*

In case of shipwreck—or the vessel's putting into a port in distress, or arriving at her port of destination in a damaged state, the port being other than that to which she belongs, *the master* is the *agent* of all concerned. It is his duty while acting in such capacity, to do all that is requisite for the protection of the property, without unnecessary delay, performing such duties in behalf and for the benefit of all concerned. He must be actuated in all his proceedings by a strict regard to impartiality, and if possible, without "reference to the particular and conflicting interests of different parties." If the property be exposed to danger, his primary efforts must be to protect it from such exposure, in the most speedy and effectual mode, and at the least possible expense. In case of shipwreck, he should make the most economical arrangement that the nature of the case will admit, to save as much property as can be saved, and to forward it to the consignees by other vessels, when the ship cannot be repaired, provided it can be done without any unreasonable expense; but if the expense of forwarding the goods to their destination would be very great, so as to exceed their value, or so great a proportion of the value, as to render it manifestly for the interest of the proprietors to sell them, they should be sold. This however is an exercise of authority which requires the utmost circumspection, and when there exists any reasonable doubt of the expediency and necessity of a sale; the goods should be forwarded. In all cases of doubt, it is advisable that the master should consult with discreet and honest men, as opportunity may present, before he decides on the course to be pursued; and having obtained the best information and advice, it rests with him to decide upon the course to be pursued, in the exercise of a sound discretion, and in behalf of all parties interested. It is however to be always kept in mind that he is not bound to follow the counsel of any person whose advice he may ask, unless it be a person having some authority over the property.

When circumstances will admit and no injury is likely to result from delay, the owner or consignee should undoubtedly be consulted, before any important measures are taken, further than to provide for the present security of the property; and in all cases the agent should communicate to the

owners, consignees and others likely to be interested, the situation of the vessel or property, as fully as he is able, with the least possible delay. When the port of necessity happens to be a foreign one, or the stranding happens on a foreign shore, the master will be governed by the laws and customs of such place. In all cases where damage to the vessel or cargo are known or even apprehended, it is necessary that surveyors should be legally called upon to examine the state and condition of the same—this duty is generally performed by Port Wardens, when only the cargo is to be surveyed; but when the inquiry or examination is to extend to the vessel, it is requisite that one or more ship carpenters should compose a part of the survey. If a vessel or her cargo has suffered more or less damage, it would not be safe for the master or agent to proceed to repair the damage or effect a sale in whole or in part, without such previous consultation. Surveyors have no authority to instruct or direct the master to sell a stranded vessel or goods that are damaged. No man can be compelled to sell his property against his own inclination, nor has any Legislature or Government a right to give Port Wardens or Surveyors power to dispossess a man of his property, nor to control him in the disposal of it, merely because he has been so unfortunate as to suffer shipwreck, except so far as may be necessary for the prevention of fraud upon the Revenue, or where articles in a perishing state are likely to endanger the health of a community. In this latter case the right of self-preservation will give the local authorities of the place the power to interfere to avert such a calamity, by causing a proper disposition of the damaged articles. In every other case, the owner or the master, his agent or representative being lawfully in possession of the property, have the whole power and control over the vessel and cargo, as perfectly after the shipwreck as before, and it is only when they request Port Wardens or Surveyors to interfere that the latter have any right so to do.

There are cases where a master ought to disregard the opinions of a survey, notwithstanding the responsibility, as if they should pronounce sentence of condemnation on a vessel that ought to be repaired, that they or their friends might become the purchasers, in a place where there would be little, if any, competition, or where they should order a vessel to be repaired, which clearly ought to be condemned, being

influenced thereto by similar motives, and generally in all cases where the surveyors, acting under the influence of corrupt intention, advise to what is clearly contrary to the true interests of the owners of vessel and cargo.

Cables carried on the deck of a vessel are at the risk of the owner. "The ship's furniture cut and thrown overboard, *must have been kept at their proper places* to entitle the owner to restitution."

The master of a vessel cannot become a purchaser at a sale of the property which is sold by his authority, as agent of the owners.

Ship masters seem to have imbibed an opinion, that the free use of the knife or the axe is necessary to charge the underwriters with the loss, for which they would otherwise not be liable. It often occurs, as appears by the protests, that sails, having been split, are cut from the yard, and the reason alleged is that they could not get them in. This may sometimes be the case, but even then the act of cutting them away does not change what was *wear and tear*, to either a partial, or General Average loss. And it very often happens, that masts or topmasts are broken and hanging over the side, attached to the rigging, by which the hull of the vessel is greatly exposed to injury, the mere use of the axe or the knife cannot change *this* which is a partial loss, to a General Average, for the loss has already accrued, and the situation in which these articles are placed by the breaking of the masts, renders them of no value whatever. It is the duty of the master to make every effort, consistent with the safety of the vessel and crew, to save as much of the wreck as he can, and although the preservation of the vessel in a storm may require that such dangerous appurtenances should be got rid of speedily, it may happen that the weather may be so favourable, that they may be in part preserved, and such successful exertions will merit the approbation of insurers, and entitle the master to their favourable consideration. It is the duty of the master at all times to act in reference to the interests committed to his charge, with perfect integrity and impartiality. He should not inquire whether the property is, or is not insured. *There is but one course* for *him to pursue, and that is an honest one*, a regard to his own interest it is supposed will lead him to ascertain its lawfulness. The master should on entering a port whether he *knows* or *apprehends* that his vessel or her cargo have sustained injury, note

a protest before the proper authorities of such port or place, and as it has been before noticed, should apply for a survey before opening the hatches, for if goods are landed and stored, and subsequently ascertained to be damaged, it may be difficult to trace such damage to the voyage of importation, and it is questionable at least, whether the underwriters would be held to pay for such damage, the legal and customary measures on arrival, and before discharging, having been omitted.

## MISCELLANEOUS QUESTIONS.

### PART II.

1. Multiply 3*s.* 9¼*d.* by 2, 3, 7, 9, 7, 9 successively.*
2. Divide £7773 0 11¼ by 5, 3, 3, 5, 11, 5, 9 successively.
3. Multiply 5 tons, 12 cwts. 1 qr. 13 lbs. 9 oz. by 9.
4. Divide 14 lbs. 11 oz. 9 dwts. 10 grs. by 9.
5. On a certain election the votes for A. and J. were 956, of which A. had 178 more than J.: required the number for each ?
6. In 120 casks of pot-ash, each weighing 3 cwt. 1 qr. 26 lbs. how many cwt. ?
7. Required the amount of the following, viz.

| *Cwt.* | *qrs.* | *lbs.* | | |
|---|---|---|---|---|
| 25 | 0 | 16 | at | 6⅜ cts. per lb. |
| 7 | 1 | 15 | " | 5 |
| 0 | 3 | 26 | " | 4⅝ |
| 1 | 0 | 17 | " | 7⅞ |
| 9 | 3 | 19 | " | 10½ |

8. In £748 13*s.* 7*d.* how many pieces of 20, 10, 9, 6 and 4 pence, of each an equal number?
9. How many grains in an ingot of silver, weighing 27 lbs. 10 oz. 13 dwts. 14 grains?

* For the assistance of Instructers, and of those who wish to teach themselves, a KEY is prepared, containing answers, solutions, and scatements in Book-Keeping by Single, and Double Entry.

10. 875 pieces of £7 0 0 each - - £
4 10 0 - - -
3 9 5 - - -
1 0 0¼ - - -
28 - - -
23 - - -
18 9 - - -
11 3 - -
7 10½ - - -
5 7½ - - -
3 4½ - - -
2 3 - - -
1 10½ - - -
9 - -
4½ - -

Proof. 875 at £21 2 6¾ - - - £

11. On a field of corn of one acre, there were gathered 213 baskets' full, one of which, when shelled, measured half a bushel and two quarts: what was the produce to an acre?

12.

| No. | Yards. | Price. | Nominal. | N. E. &c. | N. Y. &c. | Pa. & Md. | S. C. & Geor. |
|---|---|---|---|---|---|---|---|
| 1. | 9 | £0 4 3¾ | £1 18 9¾ | $6,47 | 4,85 | 5,17 | 8,32 |
| 2. | 17¼ | 5 9 | | | | | |
| 3. | 29½ | 7 5 | | | | | |
| 4. | 43 | 9 9¼ | | | | | |
| 5. | 57¼ | 11 4½ | | | | | |
| 6. | 119½ | 11¾ | | | | | |
| 7. | 213¾ | 3 9 | | | | | |
| 8. | 317¼ | 1 4¾ | | | | | |
| 9. | 413 | 2 9½ | | | | | |
| 10. | 793¾ | 7 8 | | | | | |
| 11. | 1746 | 17 9 | | | | | |
| 12. | 576 | 4 11¾ | | | | | |
| 13. | 57½ | 3 13 9 | | | | | |

13. When 24 seconds elapsed between seeing the flash and hearing the report, what was the distance, if sound travels 13 miles in a minute, or 1142 feet in a second?

14. A. on compounding with his creditors at 2*s.* 6*d.* on the pound, pays C. £43 15*s.* which was equivalent to what C. received from D. who compounded with his creditors at 3*s.* 4*d.* on the pound: what were the debts thus discharged?

15. In a canal 27 miles long, 36 feet broad, and 7 feet deep, how many cubical yards of excavation?

16. Three pieces of corn contain, viz.

1 piece 60 rows, each 75 hills.
2 " 28 " " * "
3 " 43 " " 30 "

What is the cost of hoeing these three pieces at 75 cts. per day, allowing * hills for a day's work?

17. If the minute hand of a watch or clock move round 12 times while the hour hand moves but once, what is its time in passing the hour hand?

18. It is now 6 o'clock, and the hands of a watch are directly opposite, at what time will they again be in the same direction?

19. It is between 8 and 9 o'clock, and the hour and minute hands are exactly together. What is the time?

20. How much will 18 frails of raisins, each weighing 3 qrs. 18 lbs. cost, at 6*s*. 6*d*. for 24 lbs.?

21. If a piece of plate weighing 17 lbs. 10 oz. 6 dwt. cost £64, required the weight of another which will cost £248?

22. When a stick 4 feet in length casts a shadow of 5 feet, what is the height of a steeple, that casts at the same time a shadow of 94 feet 6 inches?

23. If 4 oxen be fed on 8 acres for 6 months, how many sheep may be kept on 50 acres for 4 months, if 6 sheep eat as much as one ox?

24. A person received $31,50 for the interest of $350 for 9 months. What was the rate per cent. per annum?

25. The pulse at the wrist, in a healthy person, beats 75 times in a minute, and in that time sound flies 13 miles: suppose you count 29 pulsations between seeing the flash and hearing the report, what is the distance?

26. If 1 ton cost £19 19 $11\frac{3}{4}$, what will 19 tons, 19 cwt. 3 qrs. $27\frac{1}{2}$ lbs. come to by Direct Proportion, the answer to conform to *that* by *Practice*?

27. A. purchased a house for $1575, and repaired it for D. who agreed to pay him a rent of $220 per annum, which gives A. $12\frac{2}{9}$ per cent. for his money: required the cost of repairing it?

28. Bought a quantity of linen at 12*s*. 8*d*. for 3 yards, and by selling it at 32*s*. 8*d*. for 7 yards, I gained as much as 24 yards cost: required the number of yards purchased?

** To be supplied.

29. B. F. G. bought of L. F. S.

| | | | | |
|---|---|---|---|---|
| 48¾ | yards | Serge at $2,60 | - - | - |
| 57 | " | Baize 3*s.* 9*d.* N. E. | - | - |
| 46 | " | *Muslin* | - - | - |
| 23½ | " | Lawn $2,25 | - - | - |
| 19 | " | Linen 1,56 | - - | - |
| 28 | " | Cambric 14*s.* 3*d.* | - | - |
| 17½ | " | Cassimere 18*s.* 9*d.* | - | - |
| 34 | " | Dimity $1;75 | - - | - |
| 28 | " | Shalloon 4*s.* 10½*d.* | - | - |
| 47 | " | Broadcloth $4,75 | - - | - |

$731,95¼

The *price* of the *Muslin* being accidentally defaced, it is required to supply it by calculation.

30. Nine casks, received in the Roscoe, measured, viz.

| | *Ft.* | *In.* | *Ft.* | *In.* | *Ft.* | *In.* |
|---|---|---|---|---|---|---|
| No. 1. | 3 | 5 | 3 | 9 | 3 | 9 |
| 2. | 3 | 3 | 2 | 6 | 2 | 6 |
| 3. | 3 | 1 | 2 | 9 | 2 | 9 |
| 4. | 3 | 1 | 2 | 10 | 2 | 10 |
| 5. | 3 | 5 | 3 | 7 | 3 | 7 |
| 6. | 3 | 0 | 2 | 10 | 2 | 10 |
| 7. | 3 | 1 | 3 | 1 | 3 | 1 |
| 8. | 3 | 0 | 2 | 9 | 2 | 9 |
| 9. | 2 | 5 | 2 | 0 | 2 | 0 |

Required the freight at 9*d.* sterling per cubic foot, and the Primage at 5 per cent.?

31. A tier of wood 58 feet 6 inches long, 8 ft. 9 in. high, and 3 ft. 8 in. wide, is sold at $3,25 per cord. Required the amount?

32. A piece of land, 46 feet 4¾ inches long, and 20 feet 6 inches wide, is sold at $5,25 per square foot. Required the amount?

33. A. B. and C. agree to purchase a farm of 95 acres for $1250, of which C. takes 12 acres at cost. A. advances $400, and B. $500, agreeing, at the same time, to share the 83 remaining acres in proportion to their advance. It is required to know how much C's part cost him, how much land A. and B. have, and the cost of their respective shares?

34. The Trustees of the late U. S. Bank, having declared a dividend of 1¾ per cent. equal to $7 on each share, what were the shares valued at?

35. Two persons, A. and B. hired a coach in Boston, to go 50 miles, for $25, with liberty to take in 2 more when they pleased. Now when they had gone 15 miles, they admit C. who wished to go the same route, and on their return, within 25 miles of Boston, they admit D. for the remainder of the journey: supposing the coach to be at the expense of the parties, as they occupied it during the several stages, it is required to settle the hire between them?

36. Five persons, A. B. C. D. and E. have to share $2515,74, of which A. is to have $\frac{1}{3}$, B. $\frac{1}{4}$, C. $\frac{1}{5}$, D. $\frac{1}{8}$, and E. $\frac{1}{12}$: how much is each to receive?

37. A. B. C. and D. have to share $1000, of which D. is to have $\frac{1}{7}$ of one share, and A. B. and C. are to share equally of the remainder: required the share of each?

38. A. B. C. and D. have $2000 to be divided between them in such a manner, that for every 3 dollars A. receives, B. must have 5, C. 7, and D. 10: required their shares?

39. B. owns $\frac{3}{7}$ of a ship which cost him $3691, and sells $\frac{2}{3}$ of his part to C. at 12 per cent. advance. Required the share of each in the ship, the cost of C's part, and how much B's part now stands him in?

40. The following parts of an undivided estate in ——— were advertised for sale, viz. $\frac{5}{12}$ and $\frac{87\frac{1}{2}}{100}$ of $\frac{1}{12}$: suppose this property sold for $916,50, what would the whole cost at that rate?

41. If a lot of cloth that cost (charges included) 7*s*. 11$\frac{1}{2}$*d*. per yard, be sold for 8*s*. 8$\frac{8}{25}$*d*., what is the gain per cent.?

42. When a trader charges 1$\frac{1}{2}$ cent profit on every 12 cents he lays out, or amount of his purchase, what was his gain when his sales amounted to $2700?

43. How many perches of 24$\frac{3}{4}$ feet in a wall 46 feet 7 in. long, 7 ft. 3 in. high, and 4 ft. 9 in. thick?

44. A. owned $\frac{2}{9}$, B. $\frac{6}{12}$, and C. the remainder of an estate. A. and C. having purchased B's part, now own the whole: required their respective shares?

45. When a loss of 25 per cent. is made by selling wool at 21 cts. per lb. what was the cost?

46. B. having purchased a parcel of goods, gives his note for $853, at 6 and 9 months, and on being offered a discount of 4 per cent. without regard to time, on the whole or part, he pays $460: how much was endorsed on his note?

47. B. delivers to C. $1200, to be invested in trade, on

condition that if C. added $500 to it, and give his time as manager, he should have $\frac{2}{5}$ of the gain: what was C's time valued at?

48. A merchant having imported a parcel of goat-skins, and wishing to have some of them dressed, delivers for that purpose 560 to a currier, at $12\frac{1}{2}$ cents each, who agrees to take his pay in dressed skins to be valued at 50 cents each: how many did the currier return?

49. G. and H. buy 48 acres of land at $12 per acre, of which H. is to have a piece containing 12 acres which is contiguous to his farm, and as it is of a better quality, he is willing to pay a just proportion. G. thinks it is $\frac{1}{3}$ better, and to this H. consents: how much does each pay?

50. The room in which the Inca of Peru was confined by Pizarro, was 22 feet in length, and 16 feet in breadth. This he engaged to fill with vessels of gold, as high as he could reach, on condition of being released: supposing him to reach 7 feet 3 inches, how much would it make in cord-wood measure?

51. A. received $\frac{3}{8}$ of $\frac{1}{4}$ of a Legacy, B. $\frac{1}{5}$ of $\frac{1}{2}$, and C. the remainder of it, and when they had counted what they received, A. had $80 more than B.: how much did each receive?

52. In a sea-wall 286 feet 9 inches long, 36 feet high, and 22 feet 6 inches thick, how many cubic fathoms?

53. A. owned $\frac{1}{3}$, B. $\frac{1}{4}$, C. $\frac{1}{5}$, D. $\frac{1}{6}$, and E. the remainder of a ship, which cost $16666$\frac{2}{3}$. E. wishing to sell his part, the others purchased it at 10 per cent. discount: required the shares of the owners now, and how much each paid to E.?

54. A company of 4 Captains, 5 Lieutenants, and 60 privates, contributed £15 19 $2\frac{1}{2}$, of which each Captain paid 3 times as much as a Lieutenant, and each Lieutenant twice as much as a private: how much was the part of each one?

55. A merchant received on consignment 3 parcels of hops, viz. 480 lbs. from A. 640 lbs. from B. and 960 lbs. from C. with directions for an immediate sale, which was effected at 8 cts. per lb. for the whole; but on inspection it appeared B's parcel was $12\frac{1}{2}$ per cent. better than A's, C's 25 per ct. better than B's. What did they severally amount to?

56. A. owns $\frac{3}{11}$ of an estate, B. $\frac{2}{13}$, C. $\frac{4}{7}$, and D. the remainder. If the estate be valued at $10296, what is D's part worth?

57. Required the balance on the following interest account, by balance of products of time and money.

| Dr. | | | | Cr. | | | |
|---|---|---|---|---|---|---|---|
| To $182,00 | for | 230 | days. | By $198,50 | for | 179 | days. |
| " 136,50 | " | 185 | " | " 145,75 | " | 82 | " |
| " 275,75 | " | 106 | " | " 126,00 | " | 43 | " |

58. The interest of a certain sum at simple interest for 16 years, at 5 per cent. per annum, remaining unpaid, wanted but $9,32 of the principal: what was the sum?

59. The circumference of a piece of land is 36 rods, and the sides 10, 12, and 14 rods: required the area?

60. The largest of the Pyramids is said to be a square, containing 11 acres, 39 perches, and 222¼ square feet: what is the side of this square?

61. A merchant sold a parcel of coffee at 15 cents per lb. and lost 10 per cent.; some time after he sold another parcel of the same, to the amount of $700, and gained 40 per cent.: how many lbs. were there in the last parcel, and at what rate was it sold?

62. A merchant sold a lot of wool amounting to $900, which was at a loss of 33⅓ per cent.: required the cost?

63. Five persons, A. B. C. D. and E. gained $4050, which was so shared that ½ of the share of A. is equal to ¼ of B's, ⅓ of C's, ⅙ of D's, and ⅛ of E's: how much of the gain belonged to each?

64. If $388,56 cts. be equal to £155 8*s*. 5$\frac{12}{25}$*d*. how many shillings to the dollar?

65. A master mason is offered $25 for doing a piece of work, which he can finish in 12½ days, his journeyman can do it in 18¾, and his apprentice in 22½ days: If they work together, in what time would they finish it, and how much would they severally earn?

66. A. owns ⅞ of an estate, and B. the remainder; A. sells ¾ of his part to C., and C. sells ⅜ of his to D. who also buys ½ of A's remaining part: required the share of each in the estate, and how much they would severally receive on selling the estate for $14720?

67. A merchant in —— received from New-Orleans a bill at 30 days, for present payment of which at 1 per cent. discount, he received $2530,44, what was the discount?

68. The circumference of Constantinople is said to be 18 miles, and the sides, 5, 6, and 7 miles: required the area?

69. C. advanced to G. on his purchasing a certain estate, the amount of the purchase, on being secured to be repaid

with interest at 15 per cent. per annum. At the end of 9 months C. received $4283,12½: how much did he advance?

70. A stationer sold quills at $1,83⅓ per thousand, and gained ¼ of the money, but growing scarce, he raised them to $2,04 on the thousand, what did he gain per cent. by the last sale.

71. Bought salt at $4 per hhd. in cash, and on selling it at 10 months' credit I gained 20 per cent.: how much was it sold for?

72. A certain Club spent at a supper £15 5 0¼, and the expense of each was as many farthings as there were persons in the company: what did each pay?

73. A person bequeathed his estate in the following manner, viz. to A. ⅓, to B. ⅛ of what remains, and to C. the remainder: supposing A. and B's legacies differed $1600, how much did C. receive for his part?

74. A. owns $\frac{2}{2\frac{1}{5}}$ of an estate, B. $\frac{2}{1\frac{1}{5}}$, C. ⅔ of ⅞, and D. the remainder. E. having purchased D's part for $370,73¾, offers to pay the other owners in the same proportion, what would the farm cost him at that rate?

75. A. purchased at public sale $\frac{2}{3\frac{1}{7}}$ of a store in ——— street, and some time after he paid $1230,07½ for $\frac{7}{3\frac{1}{7}}$ of the same, which was at 10 per cent. advance on the rate of the first purchase; and to own the whole, he bought the remaining part at 25 per cent. advance on it: what did the store cost him?

76. A farmer bought a piece of land for $1200, and gave his note for the amount with interest, to be paid in monthly payments of $100 each: required the amount of interest due on the whole, when the last payment was made, and the whole interest adjusted?

77. Bought a load of walnut wood, measuring 2 cords, in sticks of 12 feet in length, and agreed with B. to saw the whole to two-feet lengths, at the usual rate of 50 cents per cord of 4 feet in length: how much should B. be paid for sawing it?

78. If 20 feet of iron railing weigh half a ton, when the bars are 1¼ inch square, what will 50 feet come to at 9¾ cts. per lb. when the bars are ⅞ of an inch square?

79. G. Bought of W. a lot of lambs' wool washed, weighing 2720 lbs. at 46½ cents per lb.; but thinking it was not sufficiently dry, he takes it only on condition that a parcel be dried, and by that the state of the whole be determined. On

trial the loss was ascertained, and deduction made, as stipulated, when G. paid W. $1169,94 in full: Required the per centage loss by drying?

80. Required the amount of the freight of 487980 lbs. of cotton to Liverpool, at $\frac{3}{4}d.$ sterling per lb. allowing the loss on weight in Liverpool to be 3 per cent.: Required also the amount if at $\frac{7}{8}d.$ &c.

81. A. claimed $\frac{7}{4\,8}$, and $\frac{1}{5}$ of $\frac{1}{4\,8}$ of a mill privilege, of which $\frac{5}{4\,8}$, and $\frac{9\,8}{1\,0\,0}$ of $\frac{1}{4\,8}$ were sold: the whole of this privilege being sold for a factory establishment in 1825, for $5000, how much of this sum should A. receive?

82. A fisherman being asked how many fish he had caught, answered that $\frac{3}{5}$ were mackerel, $\frac{1}{6}$ hake, $\frac{2}{5}$ haddock, and 21 halibuts, how many had he of each?

83. G. takes of D. 760 lbs. of rough tallow to try out, at 60 cts. per 100 lbs. clear, payment to be made in rough at 8 cts. per lb.; G. having returned 615 lbs. clear, received the balance due to him: Required the balance, allowing for waste 18 per cent.?

84. Suppose that during a storm, rain fell to the depth of an inch and two-thirds, how many hogsheads, of 100 gallons each, was it to an acre?

85. A trader allowed $300 per annum for expenses of his family, and increased yearly his remaining stock by one-third of itself; and by such management, he found at the end of three years, his original stock was doubled: what sum did he begin with?

86. G. and H. purchase a piece of land, containing 48 acres, at $20 per acre, of which G. is to have a piece, containing 12 acres, adjoining his farm, worth in H's view four dollars per acre more than the other parts: If they pay in this proportion, how much is each person's part of the cost?

87. Required a number, consisting of 2 digits, which is equal to 4 times the sum of its digits; and if to that number 27 were added, the digits would be inverted.